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Chile

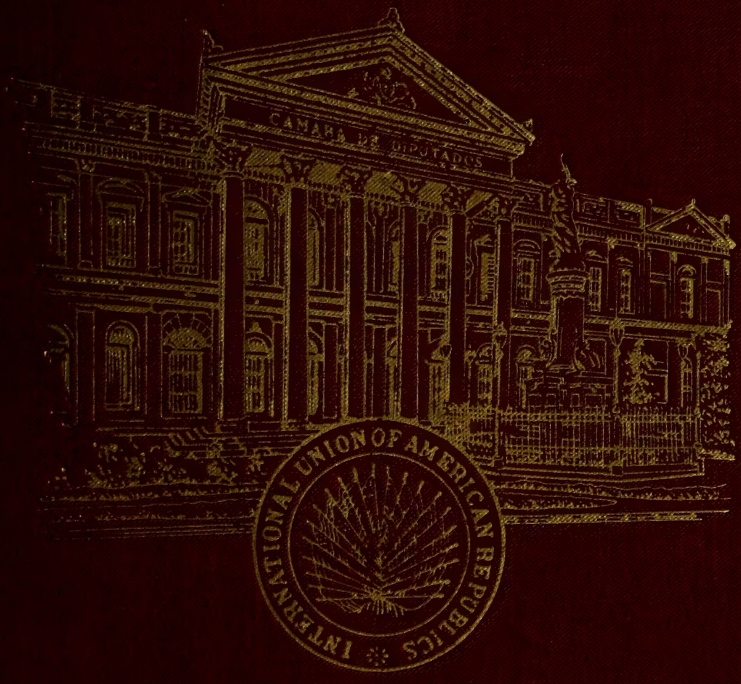
A GENERAL SKETCH

COMPILED BY

THE INTERNATIONAL BUREAU OF AMERICAN REPUBLICS

JOHN BARRETT, *Director*

FRANCISCO J. YANES, *Secretary*



WASHINGTON, D. C.

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Señor Don Pedro Montt,
President of the Republic of Chile.

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A Handbook

Compiled by the International Bureau of American Republics

INTERNATIONAL BUREAU OF AMERICAN REPUBLICS
WASHINGTON, D. C.

JOHN BARRETT - - - DIRECTOR
FRANCISCO J. YANES - - SECRETARY

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CHILE.

CHAPTER I.

GEOGRAPHICAL SKETCH. AREA AND POPULATION. BOUNDARIES. TOPOGRAPHY. OROGRAPHY. HYDROGRAPHY. CLIMATOLOGY. FLORA AND FAUNA.

GEOGRAPHICAL SKETCH. The Republic of Chile extends over more than thirty-eight degrees of latitude, occupying a narrow strip of land between the Andean mountain range and the Pacific Ocean, within latitude 17° 57′ and 55° 59′ south. It is 4,225 kilometers (2,625 miles) in length, its breadth varying from 100 to 300 kilometers (65 to 185 miles). The unique geographical position of Chile is best explained by a comparison with the State of California, Chile extending over four times the length of the latter State, while possessing less than twice the area, her length being 30 times her average width. Chile is bounded on the north by Peru, by Bolivia and Argentina on the east, the Andean mountain range forming a natural boundary, and by the Pacific Ocean on the west and south. By reason of its peculiar shape Chile is easily accessible, the numerous mineral and other products being within easy reach of the coast.

AREA AND POPULATION. Chile has an area of 755,101 square kilometers (291,500 square miles) and ranks seventh in South America as regards territorial extension. According to the census taken in November, 1907, the population was 3,248,224, or 11.16 per square mile, being about one-half the population per square mile of the United States of America (23.2 per square mile).

The increase in population is shown by the following table:

	Population.	Increase.
Census of 1835	1,010,332	
" " 1843	1,083,801	73,469
" " 1854	1,439,120	355,319
" " 1865	1,819,223	380,103
" " 1875	2,075,971	256,748
" " 1885	2,527,320	451,349
" " 1895	2,712,145	184,825
" " 1907	3,248,224	536,079

VITAL STATISTICS. During the year 1907 there were 127,772 births, 26,692 marriages and 98,080 deaths registered, there being an excess of 29,692 births over the deaths. The births and marriages show a slight increase as compared with the year 1906, while the deaths show a decrease of 7,883.

BOUNDARIES. The land boundaries of Chile were for a long time the cause of serious and protracted controversies and disputes, the majority of which have now fortunately been settled by means of various treaties, viz: Boundary treaty with Argentina, October 22, 1881; Treaty of Peace with Peru, October 20, 1883, ratified and exchanged March 20, 1884; and the treaties with Bolivia of May 18, 1895, and October 20, 1904. This latter treaty was further supplemented by a protocol defining some of the stipulations, which was signed and ratified by Chile in May, 1907. In accordance with this treaty Bolivia ceded to Chile all of the territory lying between the twenty-third and twenty-fourth parallels, between the sea and the Andes, as far as the Argentine border, which includes the port of Antofagasta. Chile paid Bolivia the sum of 200,000 Pounds Sterling ($973,000) and guaranteed the construction of a railroad from the port of Arica to La Paz, the capital of Bolivia. Chile further agreed to finance the entire undertaking, although Bolivia is to reimburse Chile in an amount equal to that much of the cost of the road built on Bolivian territory, by means of a three per cent sinking fund. The cost of the road on Chilean territory is to be defrayed by Chile. The road is well under way and 40 miles of the first section, on the Chilean side, have already been completed.

The long standing differences regarding the boundary line in Patagonia were finally settled by submitting the matter to King Edward VII of England, in accordance with the stipulations of the treaty, who rendered an award in November, 1902, as follows: The Lake Lakar depression, the valleys of Foyel, Nuevo, Cholilla, Percey, 16 de Octubre, Corcovado and the Upper Pico, all north of 44° 30′, were assigned to Argentina, while the valley of the Frias, all the Aysen basin, with the exception of a few leagues at the head of the Simpson, the Tamango and the whole of the Maravilla and Toro basins of the Ultima Esperanza district in Magallanes territory, except the upper Viscachas, were assigned to Chile.

Diplomatic relations with Peru, which had for a time been interrupted, have been re-established and negotiations for the final settlement of the Tacna and Arica question, which territory is now occupied by Chile, have been resumed.

Topography.

Chile's topographical formation presents peculiar features due to the orographic and hydrographic characteristics of the country, which divide the territory into four distinct belts or zones. The mighty Cordillera of the Andes, with its lofty peaks and numberless spurs, rises on the east, while to the west the coast or Maritime Cordillera or range follows the littoral in an almost parallel direction. Between these two ranges of mountains lies the Central Valley, having two declivities, one from north to south and the other from east to west, and extending from parallel 33° to the Reloncavi gulf. This portion of the

country constitutes one of the belts above mentioned and embraces an area of about 9°, measuring approximately 164,000 square kilometers (63,320 square miles). The Central Valley disappears at the Gulf of Reloncavi and the Coast Range ends at the Chacao Channel.

From the Chiloé archipelago to Cape Horn, there is an uninterrupted series of groups of islands and peninsulas forming an intricate net of channels, bays, coves, estuaries, etc. This region, which forms the second belt, is estimated to cover an area of 205,000 square kilometers (79,150 square miles).

The topography of the country changes once more from a point just north of parallel 33° to parallel 27°. The spurs of the Andean range extend towards the Coast range until they meet and become one, forming between the spurs narrow valleys irrigated by small rivers and creeks. This is the third belt, which covers an area of about 98,000 square kilometers (37,800 square miles).

The fourth belt embraces that portion of territory extending north of parallel 27°, as far as the boundary line with Peru, and consists of sandy plains. It covers an area of 222,000 square kilometers approximately (85,700 square miles).

COAST LINE. North of parallel 42° S. the coast line is generally uniform, but south of this latitude it becomes very broken, presenting different topographical features. The upper or northern portion of the coast has no noteworthy indentations between Arica and the Chacao channel, but from this point to Cape Horn the coast line is broken by many islands, gulfs, bays, coves, *fjords,* and channels of great depth and width. The upper coast line is interrupted only by the bay of Mejillones; that of Talcahuano which contains the island of Quiriquina; the Arauco channel containing the island of Santa María and the estuaries of the Valdivia and Maullín rivers. From Llanquihue down the coast resembles the northern and northwestern coasts of Scandinavia, and with its deep channels, bays and groups of islands is not unlike the Arctic of North America. The bays or *fjords* cut into the Andean range at right angles, in some cases extending far into Patagonia. The series of island groups which follow the coast throughout this section are interrupted by the peninsula of Taitao, an irregularly shaped promontory cut by deep channels and traversed by steep mountains. Taitao is connected with the mainland by the isthmus of Ofqui.

The southern or antarctic portion of the republic terminates in two peninsulas; the one lying to the west called King William has a very irregular outline and is separated from the eastern point called Brunswick, by the gulfs of Otway and Skyring. An idea of the irregularity and sinuosity of the coast line may be had from the fact that the latitude of the most prominent points of land varies from 17° 57′, at the mouth of the Sama River, to 55° 59′ at Cape Horn, while the longitude ranges from 70° 50′ at the mouth of the Sama to 75° 30′ at Cape Tres Montes, and 67° 16′ at Cape Horn.

CAPES. The Chilean coast line has very few capes or promontories throughout its extent. With the exception of the famed Cape Horn which forms the most southern point of the southernmost island in the Tierra del Fuego Archipelago, the following are the only ones worthy of mention: Angamos, southwest of Mejillones Bay; Tetas, to the north of Antofagasta; Lengua de Vacas forming the southwestern horn of Tongoi Bay; Curamilla, south of Valparaiso; Lavapié, jutting into Arauco Bay; Galera, to the south of Valdivia; Huechucucui in the Province of Ancud; Tres Montes at parallel 47° south latitude, and Pilares at the western entrance of the Straits of Magellan.

GULFS AND BAYS. The peculiar formation of the northern and central sections of the coast, does not admit of great indentations, there being only a few bays of inconsiderable size, but the southern portion is broken by many gulfs and bays, the following being the most important of the former: Reloncavi, in the Province of Llanquihue; Ancud lying between Reloncavi and the Island of Changues; Corcovado, southeast of the large island of Chiloé; the gulfs of Penas and San Esteban, southeast of the Taitao peninsula, and the Gulf of Otway indenting the peninsula of Brunswick. The larger bays are those of Mejillones in Antofagasta; Coquimbo and Tongoi in Coquimbo; Valparaiso in the province of the same name; Talcahuano in Concepción; Arauco in Arauco and Ancud in Chiloé. Numerous small bays and channels, extending among the island groups between Chiloé and Tierra del Fuego are being explored by Chilean sailors.

STRAITS. The Strait of Magellan, which was discovered by the Portuguese navigator Hernando de Maghellanes, on November 1, 1520, is the principal strait in Chilean waters, and separates the southern extremity of the South American Continent from the Archipelago of Tierra del Fuego, at the same time forming a means of communication between the waters of the Atlantic and Pacific Oceans. Its total length, from Cape Pilares on the Pacific side to Cape Vírgenes, on the Atlantic, is 583 kilometers (362 miles), the width varying according to the conditions of the shores, from 3 to 40 kilometers. It affords a safe passage for all kinds of vessels.

CHANNELS. Among the channels which intersect the southern portion of the peninsula are: Moraleda, separating the archipelago of Chonos from the mainland; Messier, between Wellington islands and the continent, and Beagle channel, at the southern extremity of Tierra del Fuego.

TIDES. In that portion of the coast lying north of Chiloé, the tides have a variation from about 0.15 meters to 2 meters (6 inches to 6½ feet), according to the phases of the moon. The variation between the diurnal and nocturnal tides is noteworthy, especially during the summer season, when a difference of 0.60 meters (23 inches) occurs. The tide wave flows from north to south, the high-water time occurring at the port of Arica at 8h. 5m., while that of Chiloé takes place at 12h. An interesting phenomenon occurs at Caldera and South

Mejillones, as in this section the high tide of the syzygy flows from north to south and from 8.30 to 10h.

The currents produced by the tides are rather mild, running from 2 to 3 miles per hour at the most. In the south channels the currents are more noticeable as they attain a velocity of about 9 miles per hour, especially in the Chacao and Patagonia channels. Here the tides are stronger as the water flows simultaneously from the north and the south into the channels surrounding the archipelagoes, thus determining a stronger ebb and flow.*

MARITIME CURRENTS. The ocean current which tempers the Chilean coast originates in the polar regions. After pursuing a northerly course from its point of origin, it turns to the northeast and reaches the Chilean coast between parallels 41° and 43°, where it divides into two branches. The northern branch, called the "Humboldt or Peruvian current," flows along the coast from south to north, its width being about 250 marine miles, the islands of Juan Fernandez, San Felipe and San Ambrosio lying outside of its range. The temperature of the current is low and its velocity has been estimated at about 600 meters (650 yards) per hour throughout its mean extent, but near Mocha Island it attains a greater rapidity. The southern branch, which may be called the Magellanic current follows a more rapid course in a southeasterly direction; it skirts the archipelago on the western Patagonian coast and passes around Cape Horn, its subsequent course being S.E., N.E., and N. through the Lemaire Straits.

There is also another current which washes the Chilean coast, apparently totally independent of the Humboldt current, called by the sailors "Corriente Costanera" (coastwise current). Its velocity is variable and it has been compared to a river 200 to 400 meters (656 to 1,312 feet) in width, running parallel to the coast in a northerly direction. The variations in the temperature of the ocean along the Chilean coast are very remarkable. At the 47th parallel it is 4° C. (39° 20′ F.); off Valparaiso it increases to 14° (57° 20′ F.); off Coquimbo, it is 13° (55° 40′ F.); off Cobija, it is 17° C. (62° 66′ F.), and 18° C. (64° 40′ F.) off Arica.

ISLANDS. The islands and island groups off the Chilean coast, from north to south, are in the main as follows: Alacrán, opposite the port of Arica, in the Province of Arica; Serrano, about 550 meters (1,800 feet) from the mainland, southwest of the bay of the same name, in the Province of Tarapacá; Pascua (Easter) or Rapa Nui, off the coast of the Province of Atacama, to which it belongs, having an estimated area of 24 kilometers (15 miles) in length by 18 (11 miles) in breadth; San Ambrosio and San Felix, 800 meters (2,625 feet) from the coast of the Province of Atacama to which they belong, and measuring respectively 3 kilometers (1.86 miles) by 850 meters (2,788 feet), and 3 kilometers (1.86 miles) by one meter (3.28 feet). The Juan Fernandez group, composed of two large and one small islands, belonging to

*Boonen Rivera. "Geografía Militar de Chile." Santiago de Chile, 1897.

IDOLS ON ISLA DE PASCUA (EASTER ISLAND).

Isla de Pascua, or Easter Island, is notable for its gigantic statues, presumably idols, representing various images. They are covered with hieroglyphics which bear no similarity to those of known ancient races and would therefore seem to belong to a nation entirely extinct.

the Province of Valparaiso, the largest, called "Más á Tierra," is about 670 kilometers (416 miles) distant from the coast and contains an area of 93 square kilometers (35 square miles); the second in importance is called "Más Afuera" (further off), or Perros (dog) island, and lies 160 kilometers (100 miles) west of the former, the area being 84.29 kilometers (30 square miles), while Santa Clara, the smallest of the group, is from 4 to 5 kilometers (2½ to 3 miles) in length by 2 to 3 (1.2 to 1.8 miles) in width. Quiriquina island, measuring about 8 square kilometers (3 square miles), is situated opposite the bay of Talcahuano, in Concepción, and forms part of the province of the same name; the Santa María and Mocha islands, the former lying north of Point Lavapié, 3 kilometers (1.8 miles) from the mainland, with an area of about 32 square kilometers (11½ square miles), and the latter off the coast of the department of Cañete, measuring 13 kilometers (8 miles) in length by 5 (3 miles) in width.

Among the numberless islands found in the Gulf of Ancud and the Gulf of Reloncavi, the principal are the Puluqui group, of which the largest island measures eight miles in length. The next in importance are the islands of Abtao, Lagartija, Queno, Tabón and Calbuco, all of which belong to the province of Llanquihue.

The Archipelago of Chiloé is composed of 96 islands and a large number of islets. The largest and most important of the islands is that of Chiloé, which measures 21,914 square kilometers (8,460 square miles). Other islands belonging to this province are Caucahué, Chauques, Tac, Quichao, Chelín, Quehui, Chaulinac, the Desertores group composed of 7 islands, and Lemui, Acui, Tranque, Chaulín, San Pedro and the archipelagoes of Chonos, containing over 1,000 islands, and that of Guaitecas. The territory of Magallanes contains a large number of islands, the most important ones being the Guayanecos and the Wellington group. The archipelago of Tierra del Fuego, which forms the southern extremity of South America, is composed of one large and innumerable smaller islands, the largest of these being Desolación, Santa Inés, Clarence, and Dawson, Tierra del Fuego, the largest island of this group is triangular in shape, and has a total area of 48,000 square kilometers (18,530 square miles).

Orography.

The relief of the Chilean soil is noticeable because of the similarity of its main topographical features. The Cordillera of the Andes rises on the east, the Coast or Maritime range runs along the coast and between these two chains of mountains lies the Central Valley, so-called on account of its position, Within these general characteristics, the country offers, according to latitude, certain peculiar features which may be classed into four groups. The first of these groups, the

northern tableland section, commences at the Peruvian boundary, and contains the Pampa de Tamarugal, ending at the Atacama Desert. The Puna de Atacama is the southwestern extremity of the grand Bolivian Plateau. The second section, called the Cross valleys section, extends from the northern portion of the Copiapó river basin, down to the Chacabuco spur north of the city of Santiago. As a general rule, the valleys forming this section are small and irrigated by the streams flowing from east to west. The Aconcagua River is the only large body of water in this southern section. Next comes the section or region formed by the Central Valley, which extends from the Chacabuco hills to the gulf of Reloncavi. This valley is well irrigated and is enclosed within the Andes, on the east, and the Coast range on the west. The fourth section is the Insular or Magellanic section, lying from the gulf of Reloncavi to the southern extremity of the country. Here the Andean range is very low and interrupted by a number of small valleys, lying in all directions.

ANDEAN RANGE. This is the more important of the two cordilleras or ranges which traverse the country from north to south. After forming the grand Plateau of Bolivia, the Andes, called by Humboldt "the backbone of America," stretches down to the lower extremity of the continent. This range is remarkably regular in its general trend, being formed by a succession of high mountains with lofty peaks covered with eternal snow. At intervals passes or openings are found in this cordillera, permitting access from one side of the mountain to the other, and greatly facilitating trade and traffic with the Argentine Republic. These openings are called *"dry, or cordillera ports."* The lowest of these passes is that of Perez Rosales, situated at 41° 4′, at an elevation of 985 meters (3,230 feet) above the level of the sea. The other noteworthy passes in the same range are the following:

Planchón	2,859 meters (9,380 feet.)
Paso de Valle Hermoso	3,513 meters (11,525 feet.)
Paso del Bermejo	3,842 meters (12,605 feet.)
Portillo de los Piuquenes	4,024 meters (13,300 feet.)
Portezuelo de Come—Caballos	4,501 meters (14,765 feet.)
Agua Negra	4,790 meters (15,715 feet.)

Although the slope of the cordillera from north to south is not perceptible to the eye, it is, however, very remarkable. In the Tarapacá and Atacama regions its altitude is that of the Bolivian Plateau, about 4,000 meters (13,123 feet), this altitude being maintained until parallel 31°, thence gradually declining until at the Straits of Magellan it reaches the sea level. The highest point of the Andes is between 31° and 34° where Mount Aconcagua, one of the highest peaks in the world, rises to a height of about 7,300 meters (23,000 feet) above the

INHABITANTS OF ISLA DE PASCUA (EASTER ISLAND).

The island called Isla de Pascua, or Easter Island, was explored in the year 1774 by Captain Cook and later on by other explorers, who brought from it numerous relics of an apparently extinct race. The island is situated in Lat. 27° 08′ and Long. 109° 22′ in the Pacific Ocean, 2,337 miles west of the port of Caldera, almost in mid-ocean and completely isolated.

sea level. The width of the Andean range, from east to west, is very irregular. Between parallels 27° and 34°, while its altitude is about 3,000 meters (9,800 feet), its width ranges from 100 to 60 kilometers (62 to 37 miles). Further south both the height and width decrease steadily so that at an altitude of 2,000 meters (6,560 feet) the width of the mountains varies from 160 to less than 70 kilometers (100 to 45 miles).

The following table, giving the principal peaks, their geographical position and altitude will show more plainly the general course of the range:

Names.	Latitude.	Altitude.	
		Meters.	Feet.
Monte Sarmiento (Tierra del Fuego)	54° 10′	2,100	6,890
Yanteles	43° 30′	2,020	6,625
Corcovado	43° 10′	2,250	7,380
Volcán de Villarrica or Quetripillán	39° 14′	3,600	11,810
Volcán de Antuco	37° 23′	2,762	9,060
Volcán de Nevado de Chillán	36° 47′	2,904	9,725
Nevado de Longaví	36° 14′	3,207	10,522
Volcán de La Yegua	36° 00′	3,457	11,342
Cerro del Campanario	35° 57′	3,996	13,120
Descabezado del Maule	35° 36′	3,888	12,755
Cerro Colorado	35° 18′	3,956	12,975
Volcán de Peteroa o Planchón	35° 13′	3,635	11,925
Volcán de Tinguiririca	34° 50′	4,478	14,700
Volcán de Maipo	33° 59′	5,384	17,665
Volcán de San José	33° 41′	6,096	20,000
Cerro Tupungato	33° 25′	6,710	22,015
Cerro Juncal	33° 10′	5,943	19,500
Cerro del Plomo	33° 14′	5,105	16,750
Pico del Aconcagua	32° 41′	6,970	22,865
Cerro del Mercenario	31° 59′	6,798	22,300
Cerro del Azufre o Copiapó	31° 16′	3,645	12,000
Cerro del Viento	30° 45′	4,282	14,050
Cerro Doña Ana	29° 37′	4,669	15,315
Cerro El Cobre	28° 28′	5,584	18,320
Cerro Peña Negra	28° 11′	5,580	18,300
Altura sin nombre	27° 50′	5,216	17,100
Llullaillaco	24° 15′	5,200	17,060

COAST RANGE. The Coast or Maritime range does not present, like the Andean, a continuous line, but is broken by valleys and small plains and by rivers in their course to the ocean. The slopes of this range are formed by a succession of hills covered with vegetation, the summits of which rarely attain an altitude of more than 2,000 meters (6,562 feet), and in winter are covered with snow which disappears with the summer solstice. The numberless sections which constitute this cordillera are to a great extent connected with the Andean range by cross ridges or chains which in some places, notably in the provinces of Coquimbo and Aconcagua, cause the two systems to merge into one. From Mount Chacabuco the range runs towards the coast where it ends at the Chacao channel; reappearing, however, in the islands of the Archipelago of Chiloé, extending in a northerly direction, and after traversing the island groups of western Patagonia, ends at the "Land of Desolation" or "Tierra de Desolación."

The principal peaks in this cordillera are the following:

Name.	South Lat.	Altitude.	
		Meters.	Feet.
Cerro de Huantajaya	20° 14′	1,006	3,300
Cerro de Oyarvide	20° 31′	1,767	5,800
Cerro de Colupo	22° 32′	2,187	7,175
Cerro de Limón Verde	22° 45′	3,470	11,380
Cerro de Paranal	24° 32′	1,200	3,935
Cerro de Agua Amarga	28° 49′	3,218	10,550
Cerro de Salapor	29° 36′	1,816	5,960
Cerro de Tamaya	30° 32′	1,278	4,200
Cerro de Talinai	30° 40′	1,170	3,840
Cerro de Curichelonco	32° 31′	1,212	3,975
Cerro de la Campana de Quillota	32° 57′	2,842	9,325
Cerro del Roble	32° 59′	2,210	7,250
Cerro de Morumpulli	40° 00′	1,200	3,935
Alto de Catemú	32° 44′	2,212	7,260
Alto de Coliguai	33° 15′	2,230	7,315
Alto de Alhué	33° 55′	2,221	7,285
Alto de Nahuelbuta	37° 47′	1,440	4,725

CENTRAL VALLEY. One of the most remarkable features of the orographic system of Chile is the formation of the long valley between the two cordilleras, called by reason of its location the Central Valley (Valle Central), extending, without interruption, from the 33° to the 42° parallel, or from the foot of Mount Chacabuco to the Gulf of Reloncavi, whence it continues its southern course transformed into a basin for numberless gulfs and waterways. The valley measures about 935 kilometers (580 miles) from north to south varying considerably in width. It measures 25 kilometers (15 miles) in width at the point of inception, narrowing to a few meters only at the Paine *narrows* or gorge, situated at parallel 34°, and thence it widens once more in its extension towards the south. The mean width of the valley may be estimated at about 50 kilometers (30 miles), and its total area at about 46,500 square kilometers (18,000 square miles).

Near its origin the valley is intercepted at different points by spurs of the Andean range, thus forming the plains of Santiago and Rancagua, which communicate through the *Angostura de Paine,* or Paine gorge. These plains have a very marked gradient or slope from east to west, but south of the river Cachapoal the slope is southwards, the difference in altitude with respect to the northern extremity being noteworthy. At the 38° latitude S. the depression of the valley forms the region of the lakes, the waters of which descend from the cordilleras, and at 41° 30′ it becomes submerged by the waters of the ocean, thus forming a gulf. It is within the vast extent of this valley that the principal centers of population are found, this section being the most favorable to agriculture and stock raising, by reason of the fertility of the soil. The following table shows the declivity of the valley from north to south:

Cities.	Latitude.	Altitude above the sea.	
		Meters.	Feet.
Santiago	33° 27′	520	1,705
Buin	33° 44′	488	1,600
San Fernando	34° 36′	345	1,130
Molina	35° 7′	235	770
Parral	36° 18′	167	548
Linares	35° 50′	160	525
Chillán	36° 36′	119	390
Temuco	38° 45′	113	370
La Unión	40° 15′	30	100
Puerto Montt	41° 29′	5	16

SALTO DEL SOLDADO (SOLDIER'S LEAP) BRIDGE.

During the early struggles for independence a Chilean soldier, pursued by the enemy, escaped by leaping his horse across this chasm. It is along the line of the Transandine Railway, at an elevation of 4,140 feet above sea level. The bridge is of masonry and spans one of the deepest gorges on the line.

The altitude above the level of the sea of other principal cities and towns in Chile, from north to south, is shown in the table following:

Cities.	Altitude in Meters.	Feet.
Combarbalá	1,165	3,820
Los Andes	820	2,690
Putaendo	808	2,650
San Felipe	657	2,155
San Bernardo	572	1,875
Illapel	526	1,725
Petorca	501	1,643
Rancagua	500	1,640
Vallenor	395	1,295
Copiapó	375	1,230
Rengo	284	931
Casablanca	256	840
Callipulli	244	800
Ovalle	217	712
Curicó	210	688
Melipilla	176	578
San Carlos	171	560
Los Angeles	166	545
Quillota	128	420
Traiguen	117	384
Nacimiento	113	370
Bulnes	76	250
Ligua	75	246
Talca	73	240
Angol	73	240
Serena	71	233
Limache	67	220
Osorno	22	72
Concepción	13	43
Punta Arenas	10	32
Valparaiso	3	10

Hydrography.

The hydrographic system of the country embraces a few large rivers, several *quebradas* or creeks, and numberless smaller water courses. All rivers from the northern boundary down to the lake region, in the southern provinces of Valdivia and Llanquihue, have their sources in the western slope of the Andean cordillera, with the exception of a few streams in the Patagonian region. Between the northern boundary and the Copiapó basin there are several small rivers, formed by the melting snow from the Andes. These streams do not empty in the Pacific, but either evaporate or are absorbed by the soil, to reappear further on in the shape of brooks and pools of water so heavily charged with saline matters as to be unfit for ordinary use. An old theory, which seems to be corroborated by certain phenomena, claims that there exists in Chile, especially in the province of Tarapacá, an important underground hydrographic system.

On account of the narrow shape of the territory, the course and extent of Chilean rivers are necessarily limited, so that only a few streams are navigable for small craft. In the northern section of the country rivers are few in number and small in volume, but towards the south they increase both in body and number, in proportion to the rainfall. The general trend of the streams is from their headwaters in the Andes, or in the small intermediate ranges, to the Pacific Ocean.

RIVERS. By reason of its length and the volume of water carried, the Bio-Bio is the most important river of the Chilean hydrographic system. This river, which traverses the provinces of Bio-Bio and Concepción, has its head waters in the Gualletué and Rucameo lagoons, in that section of the Inter-Andean valley called Alto Bio-Bio, or Upper Bio-Bio. Thence its general course is northerly, turning abruptly to the west, again flowing to the north until after traversing an extent of 115 kilometers (65 miles), it is joined by the Laja. Its entire course measures 256 kilometers (160 miles), part of which is navigable. Its volume is increased by numerous affluents in the form of large creeks and streams.

BRIDGE OVER THE MAPOCHO RIVER.

The Mapocho, which traverses the city of Santiago, is a tributary of the Maipo River, and although only a small stream, it rises to a considerable height at times and floods the adjoining territory. A number of long bridges have therefore had to be built, the one shown in this picture being one of the oldest.

On the northern or Peruvian boundary is the Sama River, formed by the junction of the Chaspaya River and several small Andean streams, which traverses the Republic emptying into the Pacific between Points Quiaca and Sama.

In the Province of Tacna are the Tacna or Caplina, the Azufre or Lluta rivers and Vitor creek. Tarapacá Province is irrigated by the

Camarones River, 280 kilometers (175 miles) in length, and by the creeks of Camarones, Camiña, Aroma, Chiapa, Tarapacá and Guatacondo. The Loa River, forming the northern boundary of the Province of Antofagasta, rises in the Miño volcano, whence it takes a southerly course, then turns to the west and is joined by the Salvador and Salado rivers, finally emptying into the Pacific 362 kilometers (225 miles) from its source.

In the Province of Atacama are the Huasco River, 200 kilometers (125 miles) in length, the Salado and Copiapó, each of which measures, with its affluents, 150 kilometers (95 miles). In the Province of Coquimbo are the following streams: the Coquimbo or Elqui River, 190 kilometers (120 miles); the Limarí, 160 kilometers (100 miles), and the Choapa, 150 kilometers (90 miles), besides several minor water courses. The Petorca, 111 kilometers (70 miles); the Ligua, 100 kilometers (60 miles), and part of the Aconcagua River, with their respective affluents, form the hydrographic system of the Province of Aconcagua.

The Aconcagua River is the principal river in the Province of Valparaiso, which it traverses for a distance of 60 kilometers (38 miles), the total extent of the river being 170 kilometers (105 miles) from its headwaters to its mouth. The Maipó, 210 kilometers (130 miles), the Mapacho, Yeso and Volcán water the Province of Santiago, while the Cachapoal and Maipó with their affluents traverse the Province of O'Higgins.

The Province of Colchagua is irrigated by the rivers Cachapoal, 164 kilometers (102 miles); Tinguiririca, 150 kilometers (90 miles), and others of lesser importance. The Province of Curicó is traversed by the Teno River, 84 kilometers (52 miles) in length, and by the Lontué and Mataquito, the two latter being also part of the water system of Talca Province. The Mataquito is navigable for about 18 kilometers (10 miles) from its mouth.

In the Province of Talca are also the Maule River, one of the longest in the Republic, having an extent of 196 kilometers (122 miles), and the Claro, 164 kilometers long (102 miles). The Province of Linares contains the Maule, Melado and Loncomilla rivers with their several affluents, while in Maule Province are the Maule (navigable), the Itata, Purapel and the Perquilauquen. The principal river of the Province of Ñuble are the Ñuble, the Diguillín and the Larqui, with their branches. The Province of Concepción is watered by the Laja, a tributary of the Bio-Bio, and by the Polcura and Tabolebo. The Province of Arauco is traversed by the following streams: The Larquete, Carampangue, Tubul, Lebú, Paicaví, Quiapo, Lleu-Lleu and Tirúa, with their affluents. Bio-Bio Province is watered by a river of the same name, above referred to, and by the Laja, Rucul, Cariloro and other rivers.

In Malleco are the Reinaco or Tolpan, the Mininco, the Rehue, the Picoiquén, the Traiguén and Malleco rivers, besides several of lesser

ACONCAGUA RIVER.

The Aconcagua River rises on the south side of Mount Aconcagua, the highest known peak on the Western Hemisphere, and flows into the Pacific Ocean 12 miles north of Valparaiso. The upper section rushes through narrow mountain passes and rapidly descends into the beautiful Aconcagua Valley. As it crosses the mountain range the Transandine Railway follows the windings of this river for long distances.

importance. In Cautín are the Imperial, navigable for more than 30 kilometers (18 miles), formed by the union of the Cautín and Cholchol rivers; the Dama, Mocul, Tolten and Tirúa and their affluents.

In the province of Valdivia the principal rivers are the Dognuil, Queule and the Valdivia or Calle-calle, the latter navigable for a considerable extent. The rivers of the province of Llanquihue are the Rio Bueno, the Rahue, Pilmaiquen, Petrohué, Peulla, Blanco and Maullín, with their numerous tributaries, and the Palena river, which is perhaps the largest body of water in the province. This river is navigable for a considerable distance.

The only streams worthy of mention in the province of Chiloé are the Chepú, the Pudeto and the Colu rivers. The territory of Magellan has only some small streams, among others the San José and San Juan, but its area is crossed in every direction by innumerable channels and inlets.

PERIODICAL FLOODS. All streams south of the Limarí and the Choapa rivers are subject to two annual floods, the first, which is most irregular, occurring during the rainy season or winter. The second is due to the thaw during the summer months, when the melting snow rushes down with great force from the Andean crests, carrying along very frequently enormous boulders. When the waters of these streams reach the Central Valley they are of a dark muddy color and leave on the soil a deposit or thick sediment, thus performing for the Chilean plains the same service that the Nile performs for lower Egypt. These floods last for several months, the volume of water increasing gradually from November to about the end of December. The waters commence to decrease in January, attaining their minimum volume during February.

The summer thaw does not materially affect the volume of water carried by the streams lying south of parallel 35°. Here the floods only occur during the rainy season, that is, in the months of June and July, when the waters become turbid and the overflows are frequent, flooding the country, destroying landmarks and bridges, and frequently changing the entire course of the stream, thus causing great damage to agriculture. The same occurs with the smaller streams and the marshes.

The declivity of all streams in general is such as to render them most useful for irrigation or power purposes. As an instance of this feature the following rivers can be mentioned: The Aconcagua has an inclination of about 4 per cent at its mouth, increasing up stream from 12 per cent to 52 per cent at its headwaters. The River Limarí has in the province of Coquimbo as much as 60 per cent declivity, and the Choapa has about 13 per cent inclination towards its middle course.

NAVIGABLE STREAMS. The large streams lying towards the south are navigable for small craft because of the smoothness of their current. The Maule, south of parallel 35°, is navigable for small sailing vessels and steam launches near its mouth, and for flat bottom launches up to Perales, a small fluvial port. There is a sand bar at the mouth of

this river which makes its navigation difficult because of its movable character. The Itata is also navigable for small vessels, while the Bio-Bio is navigable for flat bottom boats. The Imperial is accessible from the sea up to the port of Carahué, its depth varying from 3 to 15 meters (10 to 50 feet). The Tolten is also difficult of access because of the sand bar stretching across its mouth, vessels of less than 2 meters (6½ feet) draft only being admitted. Steamers having up to 3 meters (10 feet) draft may sail up the Valdivia River to the city of the same name. The Bueno is navigable up to Trumao, although there is a bar which impedes navigation for vessels having more than 2 meters (6½ feet) draft. In the Territory of Magellan there are some rivers navigable for small craft only. The same applies to many of the rivers whose head waters are in the Coast range.

LAKES: There are quite a number of lakes in Chile, some of them of large dimensions and considerable importance. The lacustrine system of the country has been divided into five groups or classes, according to the causes leading to the formation of the respective lakes.

The first class embraces such lakes or lagoons as are found near the coast or littoral, having a sandy bed and brackish water. The most important among these are the Puchuncaví lagoon, near the bay of Quinteros, province of Valparaiso; Santo Domingo and Bucalemu, in the Province of Santiago; and the Vichuquén in the Province of Curicó. This is the largest Lake of this group and empties into the ocean by means of a rather shallow channel, which could be improved by dredging. There are also several small lagoons further south, on the coast of Araucania.

The second group is represented by lakes formed of rain waters, which on account of the peculiarities of the soil, do not find an outlet. These lakes are as a general rule shallow and during the summer months their body of water decreases, due to evaporation. Sometimes the bed of these lakes is formed by a creek and at times they are enclosed among a series of hillocks, in which latter case they are deep and do not evaporate, even during the most severe heat. The Aculeo, the largest and most important of this class, is situated in the Province of O'Higgins, about 40 kilometers (25 miles) south of Santiago.

The third class consists of lakes formed by streams descending from the Andes, finding in the Central Valley depressions which they fill. These lakes are found in the lower region of the Central Valley, between 39° and 41° lat. S. The most important among these lakes are the Villarica, Calafquén, Piriguaico, Riñihué, Ranco, Puyehue, Rupanco, Todos los Santos, and the Llanquihue, which is the largest lake in Chile, its area being estimated at 740 square kilometers (285 square miles).

The lakes found in the Cordillera of the Andes, formed by washouts caused by the melting snow, belong to the fourth class. These

lakes are as a general rule at very high altitudes, and are the source of rivers. The principal among this numerous class of lakes are the Yuca, in the province of Aconcagua, at 2,900 meters (9,515 feet), and the Teno, which is the source of the river of the same name, in the Province of Curicó, at an elevation of over 3,000 meters (9,842 feet).

The fifth and last division is composed of such lakes as have no outlet to the sea. As a general rule these lakes are formed in the depressions and crevices of the ground, and evaporate in the summer months. These lagoons abound in the tablelands in the north, and are known as *salares,* by reason of the salt deposit that remains in the soil after evaporation. In the interior of the Antofagasta and Tarapacá provinces vast *salares* are found containing common salt and borax, the exploitation of these salt deposits being an important native industry. Along the coast estuaries are found which, during high tide, are flooded by the water from the Pacific, and after evaporation become valuable salt deposits.

Meteorology.

CLIMATOLOGY. Chile, owing to its geographical position along the same meridian from parallels 19° to 50° S. lat., and by reason of its peculiar topographical characteristics, enjoys almost every known climate, the temperature varying according to latitude, altitude, and proximity to the sea or to the cordilleras. Numerous species of animal or vegetable life thrive in the country, owing to these conditions.

Heat, even at the 19th parallel is always moderate, while the winters in Tierra del Fuego are less severe than in the temperate zone, in Europe or in the United States. The mildness of the climate in the northern section of the republic is due to the influence of the cooling action of the maritime current which passes off the coast, carrying northward the comparatively cold waters of the antarctic seas.

The peculiar climatic conditions of the country are also greatly accentuated by the configuration of the land, as it rises gradually from the coast eastward to the Andes, a variety of climates being frequently found along the same latitude. The territory can be divided into three climatic belts, that of the coast, the valley or center region, and the mountain region.

The climate on the Pacific coast is healthful and benign, and usually from 4° to 5° lower in temperature than on the Atlantic under the same parallel, one of its most pleasant features being the uniformity of temperature day and night. Abrupt transitions in temperature are more marked toward the interior though it is still healthy and pleasant, while in the Andean region and on the northern plateau the difference in temperature of the days and the nights is considerable. The seasons are well defined throughout the territory, winters being very prolonged in the antarctic region.

SEASONS. The seasons in Chile are as follows: Spring, from September 21st to December 21st; summer from December 21st to March

NATIONAL CONGRESS, SANTIAGO.

The home of the Chilean Congress is a handsome structure, in the Doric and Corinthian style of architecture, occupying an entire square, 250 by 256 feet. In the foreground is the monument of the Chilean savant, Andres Bello, while on the other side of the building is to be seen the monument erected in memory of President Manuel Montt and his Minister Varas.

21st; autumn from the 21st March to the 21st June, and winter from June 21st to September 21st.

TEMPERATURE. The following table shows the variations in temperature according to latitude:

Cities.	Lat.	Mean temperature Centigrade.	January.	July.	Difference.
Copiapó	27° 22′	14°6	18°5	11°37	7°13
Serena	29° 54′	14°8	17°5	12°14	5°36
Santiago	33° 27′	12°7	18°4	7° 5	10° 9
Valdivia	39° 48′	11°	16°4	5° 9	10° 5
Ancud	45° 51′	10°1	15°2	5°	10° 2
Punta Arenas	53° 9′	7°2	12°	1° 6	10° 4

As shown by the foregoing table, the temperature decreases gradually from north to south, but there are no abrupt changes nor the wide differences in temperature which characterize many of the capital cities of the United States or Europe, the climate of Chile being similar to that of the State of California, or the British and German possessions in South Africa. The gradual decrease noticeable in the altitude of the region of perpetual snows, from north to south, also indicates a corresponding decrease in the mean temperature. In the northern section of the country the region of perpetual snow lies at an altitude of about 5,000 meters, the decrease in this altitude being steady towards the south, at Aconcagua it commences at about 4,000 meters, at Bio-Bio at 2,000 and at 1,000 meters (6,562 and 3,280 feet, respectively) in the territory of Magellan.

The variations of temperature on the coast is shown by the following thermometric readings: Iquique, in latitude 20° 21′ S. has a mean temperature of 18° C. (64.40° F.); at Copiapó, in latitude 27° 22′, which has the same altitude as Coquimbo on the 30th parallel, the mean temperature is 15° C. or 59° F.; at Valparaiso, latitude 33° S., the temperature is approximately 15° C. or 59° F.; at Corral, 39° S., the mean of 12° C. or 53.60° F. is maintained, while at Tierra del Fuego the mean temperature is about 5° C. or 41° F. Between the 24th and 36th parallel the thermometer rarely falls to zero C. (32° F.) or rises above 30° C. (86° F.). At Coquimbo, the mean winter temperature is about 13° C. (55° F.), and in summer it is 20° C. (68° F.). Valparaiso's winter mean temperature is about 19° C., and in summer, a fraction over 11° C. (about 66° and 52° F., respectively). These differences increase towards the south; in Quiriquina, Province of Ñuble, the mean temperature during the summer is 18° C. (64.40° F.) while during the winter it is about 11° C. (51° F.). Corral, however, in the Province of Valdivia, and Puerto Montt, in Llanquihue, although further south, form exceptions to this rule, the difference between the mean temperature for summer and winter being expressed by 16° and 7° C. (60° 80′ and 44° 60′ F.). This is attributed to the abundance of rainfall in the latter districts, which temper the heat in summer and prevent nocturnal radiation in winter.

No snow ever falls on the low lands north of the 36th parallel, but there are occasional snows in the altitudes ranging from 200 to 300

meters (656-985 feet). In Valdivia and Mellipullí it remains on the ground for days at times, and in Punta Arenas there is no time from the middle of May until the middle of September when the ground is not covered with snow, the thermometer descending as low as —12° C. (10.40° F.), the highest reading for the summer months being 15° C. (59° F.). These figures, however, represent the extremes of temperature, the mean ranging from —5° C. (23° F.) to 12° C. (53.60° F.). The winter of 1884 was considered one of excessive cold, the lowest temperature recorded being 4° C. (41° F.).

In the country lying between the maritime range and the Andes the mean temperature is somewhat lower than on the coast, variations being due to the configuration of the land, and whether or not localities are exposed to the influence of nocturnal radiation and the currents of cold air sweeping in from the Andean valleys. In Santiago, the altitude of which is 560 meters (1,837 feet) above sea level, the mean temperature, according to observations taken at the Meteorological Observatory, fluctuates between 12° and 13° C. (53.60° to 55.40° F.). During winter nights the mercury occasionally falls as low as —2° and —3° C. (28.40° and 26.60° F.), and the maximum summer temperature ranges from 29° to 30° C. (84° and 86° F.). The infrequent snows rarely lie on the ground over 12 hours, even at altitudes as great as 800 meters (2,625 feet), as the first rays of the sun cause them to melt. The thermometer frequently rises to 20° and 25° C. (68° and 77° F.) on clear days in June and July, while at night it falls to 0° C. (32° F.) and occasionally lower. During the summer these variations are not so great as the temperature in the daytime rarely rises over 28° C. (82° 40′ F.), or falls lower than 12° to 15° C. (53° 60′ to 59° F.). These variations depend upon the proximity of the Andean range, which during the winter remains covered with snow at an altitude of 1,400 or 1,500 meters (4,592 to 4,920 feet), thus considerably modifying the conditions of the atmosphere. During the night a light mist falls over the valley, disappearing with the first rays of the morning sun.

In the Atacama Desert, where the altitude does not exceed 1,000 meters (3,280 feet), variations in the temperature of the days and nights between 38° C. (100° F.) and 2° or 3° C. (35° or 37° F.) are often observed. As has been stated, these variations are not so marked in the south of Chile, as the humidity of the atmosphere tempers the actions of the sun by day and radiation by night, as is the case in the Provinces of Valdivia and Llanquihue. In the Andean region, the thermometer falls as the altitude increases, certain peculiarities being noticeable, such as the very gradual descent of the mercury up to an altitude of 1,500 or 2,000 meters (4,920 or 6,562 feet). The greatest variations between day and night are features of the Andean Valley. In the Copiapó Valley, near parallel 28° and at an altitude of 1,300 meters (4,265 feet) above sea level, the temperature during the day very frequently rises above 38° C. (100° F.),

while during the night it falls as low as 20° and sometimes 8° C. (68° and 46° F.) according to the direction of the wind. At Guanta, in the Coquimbo Valley, between Latitude 29 and 30, at a height of 1,373 meters (4,500 feet), during the summer months an even temperature is maintained, this being also the case in the Maipó Valley, while in San Gabriel, 1,300 meters (4,625 feet) above sea level, the temperature during the summer months varies from 32° C. (89° 60′ F.) in the day, to 12° C. (53° 60′ F.) in the night. During winter the ground is covered with snow for several days at a time, and the thermometer falls to 5° or 6° C. below zero (23° or 24° 80′ F.).

Beyond an altitude of 2,000 meters (6,562 feet), both in the valleys and in the ramifications of the mountain ranges, the cooling process is more rapid; the west wind, which blows constantly during the day, maintains the temperature at from 18° to 20° C. (64° 40′ to 68° F), while at night it falls to 5° or 6° C. (41° or 42° 80′ F.). Between 3,000 and 4,000 meters (9,842 to 13,123 feet) of altitude, frost at night is the rule and a temperature above 12° C. (53° 60′ F.) is very rare even in regions nearer the tropics.

The observations taken at the National Observatory at Santiago give the following averages:

MEAN ANNUAL.

Cities.	Temperature centigrade.	Humidity.	Atmospheric pressure.	Wind velocity.	Rain-fall millimeters.	Rainy days during yr.
Iquique	17°4	75.4	762.4	186.1	0.0	0
Copiapó	15°7	68.5	728.6	228.6	59.0	4
Serena	14°2	66.2	764.1	190.9	171.2	17
Santiago	14°4	73.4	715.8	89.8	505.7	58
Concepción	12°9	72.5	762.4		1,511.3	102

Thermometer in the shade	14°04 Cent.
Thermometer in the sun	20°6 Cent.
Humidity	73.4 per cent.
Evaporation in 24 hours	4.87 millimeters.
Barometrical pressure	715.80 millimeters.
Velocity of wind	89.80 kilometers.
Rainy days	58.
Rain-fall	505.78 millimeters.
Wind storms	5.
Electrical storms	12.
Earthquakes	33.

The following table shows the distribution of rainfall in Chile:

Belts.	Cities.	Latitude.	Precipitation. Centimeters.	Rainy days.
Northern Desert.	———	.....	.....	.....
Infrequent Rains.	Copiapó	27° 22′	0.8	1
	Serena	29° 54°	4.	4
Central.	Santiago	33° 26′	36.	31
	Talca	35° 25′	53.5	36
	Valdivia	39° 53′	293.	155
	Ancud	41° 50′	340.	172
Patagonic.	Punta Arenas	53° 9′	57.	152

IGNEOUS AND GLACIAL PHENOMENA. There are a large number of volcanoes in Chile, most of them extinct or long quiescent. They are principally found in the Cordillera of the Andes. In the northern section, between the Bolivian frontier and Coquimbo, that is along the eastern edge of the Atacama region, there are some thirty extinct

or dormant volcanoes, such as the Llullayacu, Antofalla, Socompa, etc., some reaching an altitude of 17,000 feet. Further south are the Mercedario, estimated at 22,320 feet elevation, the Aconcagua and the Tupungato, all extinct volcanoes. The Aconcagua, although in Argentine territory, belongs to the volcanic system of the Andean range, dividing the two countries. South of Tupungato there are a succession of volcanoes, such as the San José de Maipú, San Fernando, Tinguiririca, Petorca, and several others, all apparently extinct. Then follow the Nevado de Chillán, Antuco, Villarica and Osorno, all of which occasionally emit vapors, and lastly the Tronador ("Thunderer") near the southern extremity of the country.

THERMAL SPRINGS. In the Andean range mineral springs are found at all altitudes, from the level of the sea to upwards of 1,200 meters (3,936 feet) elevation. As a general rule, the temperature of these springs, whether only suitable for bathing or for other medicinal purposes, is always somewhat higher than the temperature of the place where they are found. The temperature of these springs ranges from 22° to 42° and even to 45° C. (71° 60′, 107° 60′, and 113° F., respectively). Springs having a temperature of 100° C. (212° F.) are found sometimes near a volcano or among volcanic rocks. The peculiarity of these springs is that they are always found in such places in the cordillera where upheavals seem to have taken place. The classification of these mineral springs shows that they contain sulphur, chlorides, sulphurets, chloro-sulphates, carbonates, sulpho-carbonates, lime, iron and sulphuric acid.

The best known hot springs in the country are those of Chillán, in the Andes, about 75 kilometers (47 miles) from the city of Chillán, situated at an altitude of 1,900 meters (6,230 feet) above the sea level. These springs are of three classes: sulphur springs at a temperature of 58° C. (136° F.); ferruginous springs at a temperature of 44° C. (111° F.), and some potassium springs having a temperature of 55° C. (131° F.).

The Tinguiririca springs, in the department of San Fernando, have a temperature ranging from 70° to 90° C. (158° to 194° F.). The springs situated at Mondaca, department of Lontué, have a temperature between 37° and 44° C. (98.60° to 111.20° F.). Mineral springs are also found at Villucura, province of Bio-Bio, and at Trapatrapa; Agua de la Vida, in Colchagua, and Inca in Aconcagua. The principal mineral springs in the Central Valley are the ferruginous springs of Catillo, province of Linares, having a temperature of from 33° to 36° C. (91° to 98° F.), and the Panimavida waters, the temperature of which varies from 28° to 31° C. (69° to 87° F.). There are also springs at Cauquenes, in the province of Colchagua and at Apoquindo, east of Santiago.

Cousiño Park at Lota.

At Lota, where Chile's largest and most extensive coal mines are located, the Croesus of Chile, Señora Isidora de Cousiño, has established one of the most magnificent parks in the world, designed by the most skilful French landscape gardeners.

Flora and Fauna.

FLORA. The most striking feature of the Chilean flora, according to A. H. Keane,* is the large number of absolutely indigenous forms, showing that for long ages the Atacama desert in the north and the Great Andes in the east have largely acted as botanical divides between this region and the rest of the continent. Lack of vegetation is so absolute in the arid northern districts, that from Arica to Copiapó, a distance of nearly 1,000 kilometers (621 miles), the landscape is a dull monotonous gray, with scarcely a patch of verdure. Keane believes that parts of this region were formerly less arid than at present, but that this appears to have been largely due to the development of irrigation works under the Incas and the whole region must have long formed as effective a barrier against the migration of species as the Cordillera itself. The same authority states that among the numerous local forms are the *Skytanthus,* a dwarfish shrub with yellow flowers, like those of the jessamine, but with no allies elsewhere except two very different species in Brazil; and several varieties of the cactus family ranging as far south as Santiago, proving that this district enjoys a drier climate than is currently assumed. Peculiar to the same region are highly characteristic *Vivianeæ* and *Francoaceæ,* which are by many botanists regarded as distinct orders not known elsewhere. Of the latter, which is a stemless herbaceous growth yielding a black dye and a drug with sedative properties, as many as two genera and five species have been enumerated all exclusively from Chile. The *Vivianeæ,* also herbaceous or undershrubs, are still more numerous, comprising four genera and fifteen species, some of which appear to have wandered into South Brazil. Altogether, of about two hundred genera belonging to the temperate zone of South America, the great majority are confined exclusively to Central Chile, and among them there are several groups which show only a very remote affinity to the corresponding forms of other southern regions. From this peculiarity the authority quoted infers that it is obvious that an isolated vegetable world was independently developed on the southwest Pacific seaboard at a time when a great inland sea still flowed between the eastern and western sections of the Continent.

It is in the Coquimbo district that the peculiar Chilean types begin to make their appearance, and they would seem to range thence southwards no farther than the Bio-Bio basin, in the province of Concepción, so that this local flora like that of the Cape was originally confined to the narrow limits of the territory. In this connection Keane makes the following statement:

"Most of the endemic types have obviously originated on the western slopes of the Andes, whence some modified forms have crept down to the lowlands. * * * Even the flora of the little Juan Fernandez

*Stanford's "Compendium of Geography and Travel." London, 1901. Vol. I, page 300.

group, now mostly replaced by European intruders, was of an independent character, and more allied to that of New Zealand than of South America. Here was a solitary palm of peculiar type, and it is remarkable that in Chile also only one member of the widely-diffused palm family has been discovered. Yet nearly all the arborescent forms are evergreens, such as the bushy *peumo* (*Cryptocarya peumus*), a species of laurel with edible berries, and the *Quillaja Saponaria,* a member of the rosaceous family, highly valued for the cleansing properties of its bark.

"A distinctive feature of the Chilean flora is also the extraordinary variety of the species flourishing side by side in the woodlands. There are no continuous stretches of the same trees, as in the European pine or birch groves or in the Patagonian or Fuegian lands, where the forest growths comprise very distinct forms, besides the widespread Winter's bark and a so-called "oak," which is really a beech (*Fagus drimys*). Many exotics have been successfully introduced from Europe and other parts of the Eastern Hemisphere. Such are the chestnut, poplar and oak, which thrive even more vigorously than in Europe; the apple, which runs wild in Araucania; the willow, the vine, wheat, and several other economic plants."

Another modern writer on Chile* describes the forests of the country as having a somber beauty, peculiar to themselves, the foliage being of great variety and of exquisite coloring. The trees attain a great height and are intertwined with parasitic vines and creepers, one of these parasites, known as "angels hair," hanging from the trees like threads of lace. Throughout the forests there is an undergrowth of ferns, bamboos, shrubs and canes, the latter attaining a height sufficient to interlace with the tree tops and form roofs of green over the forest avenues.

The same author states that the pine tree grows in the mountainous districts, and one species called *piñón* (*Araucania imbricata*), is indigenous to southern Chile. This tree attains a height of more than a hundred feet, and bears a fruit greatly appreciated by the natives. Sweet scented and beautiful flowering plants, as well as roses in many varieties abound, particularly along the river course. Tropical plants grow well in the northern regions, and among the plants suitable for dyeing purposes may be mentioned a species of madder which is extensively used; a species of agrimony, producing a yellow color, and another plant which gives a fine violet tint. Grasses, sedges, reeds and rushes abound, and in different parts of the country may be found cherries, oranges and white cinnamon in a wild state. The *Cactus Coquimbanus* has thorns eight inches in length, which are used by the natives as knitting needles. The *Palma Chilensis* is a species of cocoa nut palm indigenous to the northern provinces. Willows are found in different parts of the territory.

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*Anson Uriel Hancock. "A History of Chile." Chicago, 1893. pp. 407-408.

At the Pan-American Exposition, held at Buffalo, N. Y., in 1901, among the Chilean exhibits there were about 90 different varieties of woods suitable for all kinds of work, the forestry division of the

CHILEAN PALM (*Jubea Spectabilis*).

This palm is mostly found in the provinces of O'Higgins and Valparaiso, Chile, and grows to a height of from 40 to 50 feet. It thrives in groves and produces an edible fruit, which contains a valuable oil. The sap or liquid extracted from incisions made in the upper part of the plant has a sweetish taste, and when evaporated produces the celebrated "palm honey" of Chile.

exhibits being awarded one gold and one silver medal, three bronze medals and four honorable mentions.

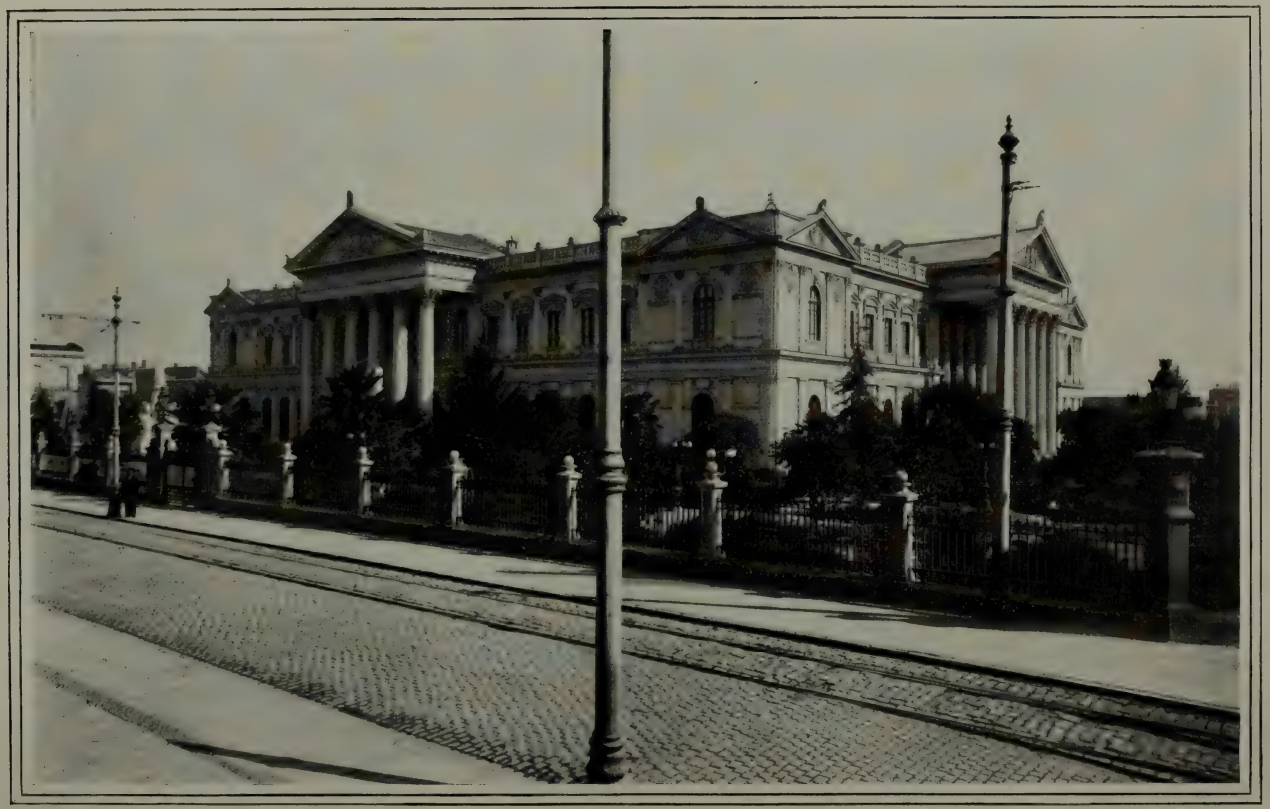
FAUNA. Keane is of the opinion that except in the class of birds the Chilean fauna is less independent than the flora.* In this connection he makes the following statement:

"Even the *huemul* (*Cervus Chilensis*), a species of deer, figuring in the national arms, is found also in Perú, and is even more abundant in Argentine than in Chile. But the *pudu,* smallest of the deer tribe, does not seem to be known elsewhere. The ape family is unrepresented, and there are no jaguars, venomous snakes, or turtles. Characteristic rodents, although not confined to Chile, are the *chinchilla* of the warm northern districts, and the *coypú,* perhaps remotely allied to the beaver, and like it, frequenting all the river banks. Both are of some economic value, owing to their much prized furs, which are largely exported to Europe. Lizards are mainly confined to the hot, arid zone, while toads and frogs in considerable variety inhabit all the marshy wooded tracts. The *vicuña* is seldom met, being mostly replaced by the allied *guanaco,* which has not been domesticated, but ranges in large herds as far south as Magellan Strait. A large spider, whose bite is much dreaded, appears to be confined to Chile, where it infests the cultivated lands and especially the wheat fields. There are no turtles and scarcely any fish in the lakes and rivers, although the marine waters abound in animal life—a peculiar species of cod, a gigantic crayfish, and enormous banks of mussels, sea otters, and several varieties of the seal family. Some of these forms range to the Juan Fernandez group, where two species of humming bird are also found, one confined to these islands and the other occurring also in the mainland, together with a third species peculiar to Chile.

"Besides the condor and parrots, ranging far to the south, the Chilean avifauna presents an extraordinary number of indigenous forms entirely confined to this region, and no doubt intimately associated with the characteristic leafy evergreen vegetation of all the central districts. Conspicuous among the marine birds are the albatross, both the white and the black species; the giant petrel, closely resembling the black albatross; the so-called "Cape pigeon" (*daption Capense*), which has an immense range in the southern hemisphere, and the Colomba, with plumage like that of a turtle-dove, but nearly as large as the Cape pigeon."

According to Hancock† there are 11 species of reptilia, 5 saurians, 4 ophidians, 1 frog, and 1 toad. There are also 7 species of cheiroptera, mostly bats; 12 carnivora, embracing 4 felines, 3 foxes and 1 weasel, 2 polecats, the nutria and the otter; 6 species of phocidæ, 1 marsupial (*Didelphys elegans*); 12 rodents, embracing 25 species, 12 being mice; 2 edentata (*dasypus* and *pichiciego*), the latter rare and peculiar to Chile; 3 ruminants; 4 cetacæ, and numerous species of incessores, grallatores and natatores.

*Opus cit., pp. 302-304.
†*Ibid.*, pp. 405-406.



PALACE OF CONGRESS, SANTIAGO, ONE OF THE PRINCIPAL PUBLIC EDIFICES NOTED FOR THEIR IMPOSING ARCHITECTURE.

CHAPTER II.

GOVERNMENT AND CONSTITUTION. CITIZENSHIP. RIGHTS OF FOREIGNERS. EDUCATION. JUDICIARY. ARMY AND NAVY.

The general movement for independence, which swept over the American continent early in the eighteenth century, found its echo in Chile in the year 1810. On the 18th of September of that year Chile declared its independence, but it was not until the year 1818, the war with Spain having lasted for eight years, that Chile finally achieved her aim.

On the 12th day of February, 1818, an independent government was established, but it was not until the 25th day of May, 1833, that the Constitution was adopted. This Constitution is still in force, and has undergone practically no changes, some amendments, however, having been adopted from time to time.

The principal features of this Constitution are as follows:

1. The Government of Chile is popular and representative.
2. The Chilean Republic is centralized and indivisible.
3. The sovereign power resides in the people who entrust the exercise of this sovereignty to the authorities established by the present Constitution.
4. Equality before the law (there are no privileged classes in Chile).
5. The freedom of persons and property, and the safety and protection of both, is guaranteed by the Constitution.
6. Liberty to dwell in any place whatsoever in Chile, observing only police regulations, and no one shall be arrested without a warrant, or imprisoned or expelled without legal process.
7. The right of association without preliminary authorization.
8. Liberty of publishing one's opinion through the press, and absolute freedom of the press.
9. Slavery in any shape or form is absolutely prohibited by the Constitution.
10. The inviolability of domicile is guaranteed to all residents of Chile, as also the inviolability of correspondence.

GOVERNMENT. The sovereignty of the nation is vested in three powers, the Legislative, the Executive, and the Judiciary, each independent from the others.

GOVERNMENT PALACE.

The Government Palace, called "La Moneda," is situated near the beautiful "Alameda de las Delicias," and is one of the largest buildings in Chile. It contains not only the offices of the President and most of his Ministers, but also the Treasury and a number of departmental offices. In the construction of this huge edifice 1,500,000 pesos were invested.

Legislative Power.

The legislative power is vested in the National Congress, which is composed of two Houses, the Chamber of Deputies (House of Representatives) and the Chamber of Senators (Senate).

The *Senate* is composed of thirty-two members elected by direct accumulative vote, by the provinces, in the proportion of one senator for every three deputies. Their term of office is six years, and the Senate is partly renewed every three years. Senators, as well as Deputies, may be re-elected indefinitely. They receive no salary.

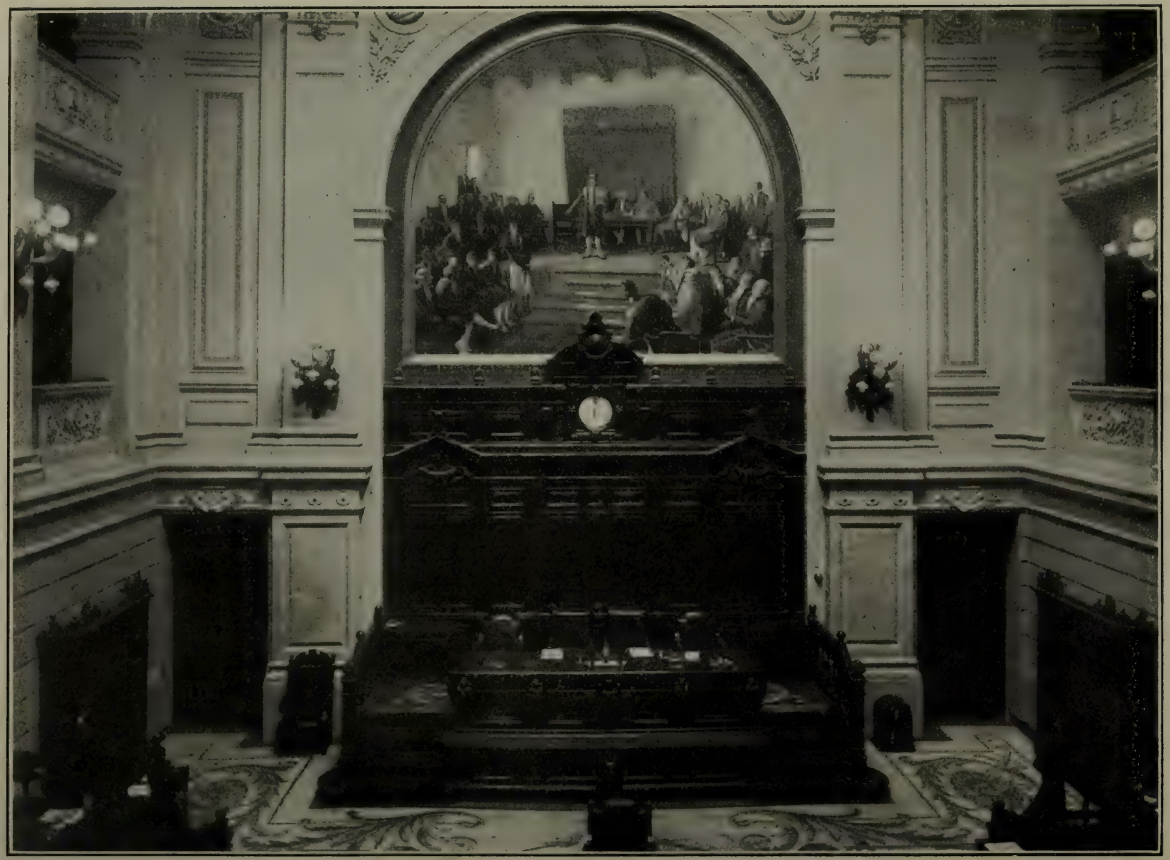
Only citizens over 36 years of age, with an income of at least 2,000 pesos per year, and of good moral standing, are eligible for election to the Senate.

Deputies are elected by direct vote in the various departments into which the Republic is politically divided, at the rate of one deputy for every 30,000 inhabitants or fraction thereof exceeding 15,000. The Chamber of Deputies is at the present time composed of ninety-four members and is totally renewed every three years. To be eligible for election as Deputy it is necessary to be a citizen entitled to vote, with an income of 500 pesos or more per year. Naturalized citizens are not eligible unless they have been in possession of their naturalization papers for five years prior to their election.

Priests, curates or assistant curates, as well as justices and all public officials, are not eligible for Deputy or Senator; also all persons having entered into or given security for the construction of public works or the supply of materials.

All laws require the approval of both Chambers of Congress and must be sanctioned and promulgated by the President of the Republic.

Congress exercises its fiscal powers over the Executive by giving or refusing its confidence to the Ministers or Secretaries of State appointed by the President of the Republic. It fixes, every year, the sea and land forces which may be maintained and the estimate of public expenses for the following year; approves or disapproves the budget submitted by the President, and authorizes the taxes, duties and other sources of revenue. Congress has the sole power to declare war, to permit foreign troops to land on Chilean territory or to grant permission to Chilean troops to leave the National territory. Congress may impeach and disqualify the President or other public officers to hold office, and may enact laws suspending or restricting the liberty of the press or of individuals, whenever the defense of the State, the preservation of the Constitutional system or of the internal peace may demand such extraordinary measures. Congress may not, however, enact laws suspending the constitutional rights of citizens except in the cases cited above. It is also the prerogative of Congress to create and abolish public offices, fix the duties and salaries of public officials, grant pensions and decree public recognition for meritorious services, grant general pardons and amnesty, and designate the place of residence of the representatives of the Nation and for the meeting of Congress.



SENATE CHAMBER OF THE CHILEAN CONGRESS.

The Capitol of Chile is considered one of the handsomest public structures in South America. It is rectangular in shape, measuring 250 by 256 feet, and occupying the entire square. The painting shown in this view represents the meeting of the First Congress of Chile, at which the Constitution was framed and adopted.

Each Chamber has the exclusive right to determine the validity of the election of its members, and to accept or decline the resignation of such members. The Chamber of Deputies is vested with exclusive authority to impeach before the Senate any member of the Cabinet or of the State council, Generals, Judges of the higher courts, members of the standing congressional committee or Intendentes of the Provinces.

The Senate is vested with the exclusive right to try all officers impeached by the Chamber of Deputies, acting as a high Tribunal; and to approve or reject all nominations made by the President for the Archbishopric or Bishoprics.

Congress holds an ordinary session once a year, which begins on the first day of June and ends on the first day of September, and as many extraordinary sessions as the President of the Republic may deem necessary or expedient.

Before Congress adjourns a standing committee is chosen, consisting of fourteen members, seven from the Chamber of Deputies and seven from the Senate. This committee acts as the representative of Congress during the time of its recess and must see to it that the Constitution is carefully observed and that the laws passed by Congress are properly enforced. The President of the Republic must consult this Committee on all matters of importance, which would otherwise be referred to Congress, and the committee may request the President to call a special session of Congress whenever, in its judgment, such action is necessary. The functions of this committee cease on the 31st day of May of the following year and it must report to Congress at its first meeting.

Executive Power.

The Executive Power is vested in the President of the Republic, who is the head of the administration and the supreme chief of the Army and Navy. The President is chosen by Electors, who are elected by direct vote of the people. The number of Electors is equal to three times the total number of Deputies.

The President is elected for a term of five years, and cannot be re-elected for the next consecutive term.

Any citizen born in Chile, being over 30 years of age, and possessing all the necessary qualifications of a Deputy, is eligible for President.

During his term of office and for one year after the expiration of his term, the President may not leave the country, except with the consent of Congress.

Should the office of President become vacant through resignation, inability or death, or should the President assume the command of the troops, leave the country or otherwise be prevented to discharge the duties of his office, the Minister of the Interior, under the title of "Vice-President of the Republic" shall act as President until such

time as the President shall resume his duties, or a new election is held. In the case of death, resignation or permanent disability of the President, the Vice-President shall at once issue orders for a new election.

If, for any reason, the Minister of the Interior should be unable to assume the Presidency, then the oldest member of the Cabinet succeeds him, and if all the Cabinet officers should be incapacitated or absent, then the oldest member of Council of State shall succeed to the office, if he is not an ecclesiastic.

THE COUNCIL OF STATE acts as a board of advisers to the President and is consulted by him on all matters of importance. It consists of eleven members, six of whom are appointed by Congress and five by the President. The Council intervenes in a number of appointments, the granting of pardons, the declaration of war with a foreign power, the promulgation of laws, etc., etc. The Councillors of State may be held responsible by Congress for the opinions rendered by them to the President, and may be impeached and tried before the Senate the same as any other public officer.

CABINET. There are eight executive departments in Chile, which are, however, only under six Ministers or Secretaries of State, as follows:

Interior.	Foreign Affairs, Church and Colonization.
Justice.	Public Instruction.
Treasury.	War.
Navy.	Industries and Public Works.

The Departments of Justice and of Public Instruction are under one Minister and also the Departments of Navy and War. Each one of these departments is, however, in charge of an Assistant Secretary, who is the immediate and permanent chief of the service.

THE DEPARTMENT OF THE INTERIOR has charge of the political government of the Republic, as also of the police of the cities, post office and telegraphs, public health and charities, and general statistics. The Intendentes and Governors, who are the chiefs of the territorial divisions and who are appointed by the President, are directly responsible to the Minister of the Interior.

THE DEPARTMENT OF FOREIGN AFFAIRS, CHURCH AND COLONIZATION is divided into two main sections, namely, the Diplomatic and Consular section and the section for Worship and Colonization. The former has charge of all matters pertaining to the Legations and Consulates, at home and abroad, as well as all boundary questions, etc. To the latter belong all matters related to the maintenance of the church, as well as all matters pertaining to colonization, public lands, etc.

THE DEPARTMENT OF JUSTICE has in its charge whatever relates to the Judicial Power, as also the control of the penal establishments, the civil registry, etc.

CHILE.

THE DEPARTMENT OF PUBLIC INSTRUCTION is divided into two sections: the section of Primary Instruction and the section of Secondary, Higher and Special Instruction. The first-named section has charge of all the schools for primary education, normal schools and some industrial schools; the other section has charge of the University of Chile, the Institute of Pedagogy, the National Institute, the Commercial Institute, the Conservatory of Music, the School of Fine Arts, the School for the Blind and Deaf and Dumb, the Astronomical Observatory, the Public Libraries, the Botanical Garden and the Museums.

THE DEPARTMENT OF THE TREASURY attends to the administration of the public revenues, the custom house service, the public debt, etc. The valuable guano and nitrate deposits are also under the control of

A MILITARY SURVEY IN CHILE.

Among the numerous duties that devolve on the army in Chile, that of surveying and of drawing maps and plans of the topographical and other features of the country is one of the most important ones. The General Staff of the Army has charge of this work.

this Department. The Department of the Treasury also maintains a tribunal of accounts, which must audit all public accounts, and may, at any time, investigate the affairs of any Department dealing with or having charge of public funds.

THE DEPARTMENT OF WAR is entrusted with the maintenance of the army and all matters relating thereto. The country is divided into

SOLDIER OF A CHILEAN CAVALRY REGIMENT ON A WAR FOOTING.

The military organization of Chile is modeled after the German army, and German instructors are employed with this end in view. The active army in time of peace consists of sixteen battalions of infantry, six regiments of cavalry, and seven regiments of artillery, with auxiliaries. All able-bodied citizens of Chile are obliged to serve, liability for which extends from the eighteenth to the forty-fifth year.

five military zones, with headquarters at Santiago. The army is composed of 6 regiments of artillery, 10 of infantry, 8 of cavalry and 1 of engineers. Chile has compulsory military service, and some 15,000 men are instructed annually, while about 500,000 citizens are enrolled in the National Guard. There are 10 Generals, 18 Colonels, 135 Commanders, and 700 officers for the regular army.

The Academy of War, the Military School and the School for Sergeants and Corporals are the principal schools for military instruction.

THE DEPARTMENT OF THE NAVY. The Navy and everything pertaining thereto is under the control of this department, as also the military administration of the ports, the coast defense and lighthouses and the hydrographic service.

The Chilean fleet is composed of 40 vessels, among which are 9 iron-clads and protected cruisers, 5 gunboats and torpedo cruisers, 1 training ship, 4 destroyers and 13 torpedo boats, etc.

The personnel of the Navy is composed of 1 Vice-Admiral, 5 Rear-Admirals, 18 Captains, 28 Commanders, 38 Lieutenant-Commanders, and 825 officers.

Naval instruction is given at the Academy at Valparaiso and at the training schools at Valparaiso and Talcahuano.

THE DEPARTMENT OF INDUSTRIES AND PUBLIC WORKS has charge of all public works, as also of the State railways, all industrial institutions, and the granting of patents and trade-marks.

The Ministers or Secretaries of the Different Departments are directly responsible to the President, but may be called upon to report to Congress at any time.

All orders issued by the President must be countersigned by one of the Ministers, and cannot be enforced unless so countersigned.

The Ministers are responsible for all of their official acts, and may be impeached and tried by the Senate.

Ministers may, and very often are, chosen from the Senate or Chamber of Deputies, and when so chosen they may hold both offices at the same time. Ministers may attend the sessions of Congress and may participate in the debates, but may not vote unless they are members.

Chile has no Department of Agriculture, but a division of Agriculture is incorporated in the Department of Industries and Public Works, in which department a division of Labor has also recently been created.

Judicial Power.

The administration of justice is vested in the following courts:

I. A Supreme Court consisting of seven members, sitting in the capital and having jurisdiction all over the country. One of the members of the Supreme Court presides over its sessions, under the name of President (Chief Justice), while the other members are called Ministers (Associate Justices).

II. Seven Courts of Appeals, one at each of the following points: Tacna, Serena, Valparaiso, Santiago, Talca, Concepción and Valdivia. The Court of Appeals of Santiago consists of twelve members, that of Concepción of eight, and the rest of five members each. The jurisdiction of the Court of Tacna extends over the provinces of Tacna, Tarapacá and Antofagasta, except the Department of Taltal. That of Serena comprises the provinces of Atacama and Coquimbo, and the Department of Taltal. The Court of Valparaiso embraces the province of Valparaiso, the Territory of Magellan and the Juan Fernandez Islands. The Court of Santiago comprises the provinces of Aconcagua, Santiago, O'Higgins, Colchagua and Curicó. The jurisdiction of the Court of Talca extends over the provinces of Talca, Maule, Linares and Ñuble; that of Concepción over Arauco, Malleco, Cautín, Bio-Bio, while the Court of Valdivia's jurisdiction extends over Valdivia, Llanquihue, and Chiloé.

III. One Justice of the Peace (*jucz de letras*), holding court in the capital of each department, with original jurisdiction over its respective district, which may be extended over the entire department in case the density of population demands more than one justice of the peace. Each court has its Clerk and other assistants, besides an officer called *Promotor Fiscal* (prosecuting attorney).

IV. A judge of Sub-delegation (*juez de sub-delegación*) in each sub-delegation, and a district judge in each district of the Republic.

The necessary qualifications, mode of appointment, and duties of these different judges and courts are set forth in the law bearing on the subject.

Internal Government and Administration.

The Government of Chile is a popular and representative one and the Republic is one and indivisible. It is not a confederation of States or Provinces, but a State with but one Central Government. Chile is divided into 23 Provinces and 1 territory. The Provinces are divided into Departments, the Departments into Sub-delegations, and the latter into Districts. The Provinces are governed by an "Intendente," who is appointed by the President and holds office for a term of three years. The Departments are governed by "Governors," who are subordinate to the respective "Intendente," and are appointed by the President on the recommendation of the "Intendente." Their term of office is also three years. The Sub-Delegations are governed by a Sub-Delegate, holding office for a term of two years, and the Districts by an "Inspector."

For the purposes of local administration the territory of the Republic is divided into Municipal Districts or "Communes," one for each 20,000 inhabitants. These Municipal Districts or "Communes" are governed by a board, composed of nine members, three of whom are magistrates (alcaldes), and the remaining six are "aldermen" (regidores). A member of the "Municipal Board" may not hold any other

MUNICIPAL BUILDING, SANTIAGO.

The Municipal Building, shown in the foreground of this picture, is situated on the north side of the beautiful Plaza de la Independencia, or Plaza de Armas. The adjoining building, with the tower, is the office of the Intendente, or Governor of the Province of Santiago, the Post Office being next to it.

public office at the same time, and several members of one family, no matter how remote their affinity or relationship may be, cannot serve on the board at the same time. The only exceptions to this rule are in the Department of Tacna and in the Departments forming the Territory of Magellan, where special Boards are appointed every three years by the President, composed of three magistrates, who exercise municipal functions conjointly with the "Jefe Politico" appointed by the President for those Departments.

Citizenship.

CONSTITUTIONAL PROVISIONS. The constitutional provisions relating to citizenship are as follows:

"The following are Chileans:

"1. Persons born within the territory of Chile.

"2. Persons born of Chilean parentage in foreign territory, in the event of becoming domiciled in Chile. Children of Chileans born in foreign territory, while the father is in the actual service of the Republic, are Chileans for all intents and purposes for which the fundamental laws, or any others, require nativity in Chilean territory.

"3. Persons of foreign birth who, having resided one year in the Republic, declare before the proper authorities their desire to become domiciled in Chile, and apply for naturalization papers.

"4. Persons who obtain a special grant of naturalization by act of Congress."

Persons not born in Chile and desiring to become citizens of the Republic must make the requisite declaration before the municipal board of the department where they reside, and in no case can naturalization be obtained otherwise than in accordance with the prescriptions contained in rule 3 above mentioned. Upon the registration of a favorable decision by the municipal board, the President of the Republic will issue the proper naturalization papers.

Male Chileans over twenty-one years of age who are able to read and write, and have been duly inscribed in the electoral register of their respective department, are entitled to exercise the right of suffrage, as provided by law. The right of vote is suspended in the following cases:

1. Physical or mental incapacity, which prevents free and conscientious action.
2. For being a servant.
3. For being prosecuted for a crime calling for corporal punishment.

Education.

Education in Chile, though not compulsory, is absolutely free, and within the last few years the Chilean Government has given considerable attention to Public Instruction, and has been gradually extending the school system all over the country, until now there are 2,215

elementary schools with 4,729 teachers, and an attendance in 1907 of 170,827 pupils. Besides these there are 118 private schools for elementary instruction subsidized by the Government, which receive $194,300.

Secondary instruction is provided in the National Institute at Santiago and in the various lycees, of which there is one in every provincial capital and in every city or town of any importance. In 1907 there were 39 of these institutions for men and 30 for women, having an attendance of 7,896 and 3,839 scholars, respectively.

Higher education is provided in the National University at Santiago and at the various Normal Schools, of which there are 15 in Chile, 6 for men and 9 for women.

Industrial, commercial and agricultural instruction is provided by the Government in special schools, also gratuitously, and by the various societies, as the Sociedad Nacional de Agricultura (National Society of Agriculture), the Sociedad de Fomento Fabril (Society for the Improvement of Industries), and the Sociedad Nacional de Mineria (National Society for Mining), all of which maintain schools in various Provinces and receive subsidies from the Government for that purpose.

Commercial schools are maintained at Iquique, Antofagasta, Valparaiso, Santiago and Concepción, as also at Vallenar, Coquimbo, Talca and San Carlos. At these schools there were 1,182 pupils during the year 1907.

There are 17 industrial schools in Chile under the direction of the Sociedad de Fomento Fabril, which cover all lines of industry, and in which there are also divisions for the preparation of engineers, electricians, architects, gasfitters, plumbers, carpenters, masons, etc., etc. The attendance at these schools during the year 1907 was 3,195 pupils.

Practical schools of agriculture are maintained at Concepción, Santiago, Talca, San Fernando, Elqui and Salamanca. These schools are under the supervision of the Sociedad Nacional de Agricultura and the Government contributes liberally towards the maintenance of the same. The Agricultural Institute and the Industrial Agricultural School at Chillan are other establishments for practical agricultural instruction, and besides the Government maintains a number of model farms and contributes largely towards the expenses of maintaining the Quinta Normal at Santiago, in which are situated a Museum, a zoological garden and a number of experimental stations for the cultivation of trees, vines, etc., and in which is also situated the National Agricultural Institute, with professors of rural economy, arboriculture, viticulture and vinification, agricultural chemistry, rural legislation and a veterinary school.

At Copiapó there is a practical school for mining, and at Santiago and La Serena are schools for practical instruction to mining engineers and miners.

Military instruction is obtained at the Military Academy and four military schools, while the Naval Academy and four schools provide instruction for those wishing to join the Navy.

Besides the National University, which has faculties for law and political science, medicine, dentistry, physics and mathematics, there is the Catholic University, which has faculties for law, civil engineering, architecture and agriculture. Other institutes are the National Conservatory of Music, the School of Fine Arts, the National Observatory, the Institute for the Deaf and Dumb, and the School for the Blind.

MUSEUM OF FINE ARTS, SANTIAGO.

One of the buildings situated in the "Quinta Normal de Agricultura" is the Museum of Fine Arts, in which are to be seen a number of the most noted productions of Chilean painters and sculptors.

A number of public libraries are established in various cities, among which the National Library at Santiago and the Public Library at Valparaiso are the most important. The Library of the National Institute, the Library of Congress, the Library of the Department of Statistics and the Library of the Navy are also of considerable importance.

Among the museums, the National Museum at Santiago is the most important. Other museums are the Military Museum, the Museum of Fine Arts, both at Santiago, the Museum of Natural History at Valparaiso, and the Museum at Concepción.

The sociedades de Fomento Fabril, de Agricultura and de Minera,

THE NATIONAL LIBRARY OF SANTIAGO, CHILE.

The library contains more than 150,000 volumes and manuscripts, and circulates about 40,000 volumes annually. To the left is a statue of Don Andres Bello, first president of the National University of Chile, who, although born in Venezuela, spent most of his life in Chile working for the intellectual uplift of its people.

mentioned above, from time to time hold expositions, in which they exhibit the products of the soil and manufactories, as well as the latest processes and appliances, and the Government contributes liberally towards defraying the expenses of these expositions. These societies are formed by a large number of the most prominent Chileans, who devote considerable time and energy to the development and improvement of the manufacturing industries, agriculture and mining, and who assist the Government in its endeavor to bring about a better develop-

RECOLETA CHURCH, SANTIAGO.

One of the handsomest of Chile's many churches is the "Recoleta Dominicana," situated in the eastern section of the city of Santiago, near the cerro Santa Lucia and not far from the "Alameda de las Delicias," surrounded by a number of handsome residences and public buildings.

ment of the natural resources of Chile. These Societies, in addition to maintaining practical schools of instruction, experimental farms, expositions, etc., also publish a monthly Bulletin, containing valuable information and hints for the farmer, merchant, manufacturer, etc., etc.

In Chile there are published some 400 papers and periodicals, daily, weekly, bi-weekly, and monthly, some of which, especially the large newspapers of Santiago and Valparaiso, such as "El Mercurio," "El Ferrocarril," etc., are thoroughly modern and up-to-date, having an excellent telegraphic news service.

There are also some forty literary and scientific societies in Chile, which from time to time give public lectures on different subjects.

Religion.

Although religious freedom exists in Chile, the Roman Catholic Church is under the protection and support of the Government. The Constitution provides that: "The religion of the Republic of Chile is the Roman Apostolic Catholic, to the exclusion of any other." By act of July 27, 1865, explanatory of this section, it is established that those who do not profess the Roman Apostolic Catholic religion are allowed to worship within the enclosure of private buildings, dissenters being permitted to establish and maintain schools to instruct their own children in the doctrines of their respective religions.

The territory of the Republic, from a religious standpoint, is divided into one Archbishopric, three bishoprics and two vicarages. The ecclesiastical province of Chile consists of the Metropolitan Church of Santiago, and the bishoprics of Serena, Concepción and Ancud. Since 1882, two ecclesiastical vicarages were established in Tarapacá and Antofagasta, respectively, both dependent upon the Holy See. The jurisdiction of the Archbishopric is estimated to cover an area of 67,388 kilometers, and is divided into 101 parishes, containing about 1,260,000 inhabitants.

There are a number of foreign missions in different cities of Chile, and Methodist, Presbyterian and other churches are established.

THE CATHEDRAL, SANTIAGO.

Santiago Cathedral, an imposing structure and one of the oldest churches in South America, is situated on the Plaza de la Independencia, or Plaza de Armas, Santiago's favorite "paseo."

A View of Santiago.

The capital of Chile was founded in 1541 by Pedro de Valdivia. It lies on a fertile plain on the banks of the Mapocho River, near the foot of the Andes, at an elevation of about 1,800 feet above sea level, and has a population of nearly 400,000 inhabitants. It is connected by rail with Valparaiso, 42 miles distant, which is its seaport. Santiago is noted for its beautiful parks and the splendid architecture of its buildings.

CHAPTER III.

POLITICAL DIVISIONS. THE CAPITAL, ITS RESOURCES, MEANS OF COMMUNICATION, BANKS, PUBLIC BUILDINGS, ETC.

TERRITORIAL DIVISIONS. The Republic of Chile is politically divided into 23 Provinces and 1 territory. The following table shows the area of the different Provinces and the territory:

	Kilometers.	Square miles.
Province of Tacna	24,900	9,615
Province of Tarapacá	47,680	18,400
Province of Antofagasta	121,300	46,830
Province of Atacama	78,820	30,430
Province of Coquimbo	34,880	13,465
Province of Aconcagua	14,020	5,410
Province of Valparaiso	5,020	1,935
Province of Santiago	14,820	5,720
Province of O'Higgins	5,320	2,050
Province of Colchagua	10,020	3,870
Province of Curicó	7,500	2,900
Province of Talca	9,700	3,750
Province of Linares	10,140	3,875
Province of Maule	6,280	2,425
Province of Nuble	9,220	3,460
Province of Concepción	9,180	3,545
Province of Arauco	5,340	2,055
Province of Bio-Bio	12,220	4,720
Province of Malleco	8,060	3,100
Province of Cautin	15,920	6,150
Province of Valdivia	21,740	8,400
Province of Llanquihue	94,900	38,575
Province of Chiloé	22,255	8,600
Territory of Magallánes	165,866	64,040
Total	755,101	291,540

Santiago de Chile.

Santiago (Santiago de Chile), capital of Chile, is the third largest city in South America and one of the most beautifully situated capitals in the world. It lies on a level plain, 1,706 feet above the sea, with the curving line of the Andes 10 miles distant, showing a succession of magnificent snow-covered peaks. The city covers an area of about eight square miles, extending three miles from east to west, and two and one-half miles from north to south; it is crossed from east to west by the Mapocho River, which passes through an artificial stone channel 130 feet in width and two miles in length spanned by five iron bridges.

The streets of Santiago are well paved with Belgian blocks and asphalt and lighted by gas and electricity, and numerous electric street cars run in all directions and facilitate the transit of passengers.

View of a Section of the Plaza de Armas, Santiago, Chile, Showing a Portion of the Capital City in the Direction of Santa Lucia Hill, a Popular Breathing Place and Promenade for the Inhabitants of the City.

The principal avenue, the Alameda de las Delicias, is two miles long and 350 feet wide. Facing this avenue are the majority of the handsome private residences of the city.

The Santa Lucia Hill, with its world-renowned gardens, lies almost in the center of the city and rises to an altitude of 400 feet.

Santiago was founded in 1541 by Pedro Valdivia, when he reached the banks of the River Mapocho, after his march across the desert of Atacama. It is said that he had made a vow to name the first city he would establish after the patron saint of Spain, St. Jago, out of which grew the name Santiago.

Santiago is naturally divided into five sections. The old or central section lying between the Mapocha River, the Alameda de las Delicias and the Santa Lucia Hill, is the business quarter and contains also most of the governmental buildings. The southern section, embracing all that part south of the Alameda, is the principal residence section, while the Yungai, or western section, extends north of the Alameda and contains the Normal and Agricultural Schools as well as the Museum of Natural History. Santa Lucia, or the eastern section, extends from the Santa Lucia eastward, and Chimba or the northern section is all that part of the city north of the Mapocho River. In this latter section are located the two hills, called Cerro Blanco and Cerro San Cristobal.

The city of Santiago is well provided with parks, the largest of which is the Parque Cousiño, which has an area of 201 acres and contains a lake of seven and one-half acres. The Quinta Normal de Agricultura (Agricultural School Farm) covers 320 acres. It contains zoological and botanical gardens and an experimental station, as well as a museum and observatory.

Santiago has twelve large clubs, seven hospitals and seven theaters, including the Municipal Theater.

The climate of the city is mild and good sanitary conditions prevail throughout the city. The mean annual temperature is estimated by the National Observatory at Santiago as 14.4° C., or about 58° F. The highest temperature experienced during the year 1902 was 34.2° C., or about 94° F., and the lowest temperature during the same year 0.9° C., or about 33° F. The mean annual humidity for the same year was 73.4; the mean annual atmospheric pressure 715.8; the velocity of wind averages 89.8; the average rainfall 505.7 millimeters, the rainy days in the year 58.

Educational interests are represented by a national university and two other universities, a mining school, manual training school, commercial school, agricultural school, professional school for women, normal school for males, normal school for females, four high schools for boys, three high schools for girls, besides numerous public and private schools and institutions for primary and secondary education. One of the most important educational institutions is the School of Arts and Trades, founded in 1849, where free industrial instruction

THE ALAMEDA, SANTIAGO.

The boulevard extends some distance along the foothills of the Andes, forming a magnificent driveway and promenade in one of the most beautiful and desirable residence sections of the capital. Formerly it was lined with two rows of stately poplars. Recent improvements caused the destruction of many of these giants, although other trees planted in their stead are rapidly restoring the avenue to its former beauty.

can be obtained. A number of electricians, iron masters, typographers, carpenters and boilermakers, etc., graduate from this institution every year. Aside from these, the "Sociedad de Fomento Fabril," a society for the promotion of industrial progress in Chile, maintains four technical colleges in the city. There is also a school for telegraphy, maintained by the state railway corporation. The Government also maintains a Professional School for Girls, where the manufacture of artificial flowers, as also dressmaking, cooking, painting, embroidering, etc., are taught.

Sixty-one newspapers and periodicals are published in the city of Santiago. Eighteen of these are published daily, one three times a week, one twice a week, eleven weekly, seven fortnightly and twenty-three monthly.

AN ARTIST'S STUDIO IN SANTIAGO.

Manufacturing interests are represented by 9 flour mills, 8 woodworking plants, 7 large foundries and machine shops, 6 tanneries, 6 carriage factories, 5 furniture factories, 5 liquor factories, 3 breweries, 3 brush and broom factories, as well as macaroni, bread and cracker, smoked and dried meat, harness and saddlery, chemical and drug, bicycle, marble, corset, chocolate, ink, water-proof, hemp sandal, musical instrument, tin box, scale, metal bedstead, shoe, glove, aerated water, vinegar, cooperage, felt hat, stearine candle, fertilizer, silk, cigar and cigarette, picture frame, cordage, tile, brick and shirt factories.

There are two telephone companies in Santiago, and the city has telephone connection with Valparaiso and other nearby towns. The state telegraph lines and four private companies provide telegraph facilities with all parts of the country. There are also two submarine cable companies located at Santiago. A belt railway line surrounds the city, and railways connect the city with the other parts of the country. Santiago is also connected with the Transandine Railway, which, when finished, will afford direct railway communication with Buenos Aires and the Argentine Republic.

The following are the national banks in the city of Santiago:

Banco de Chile.	Banco de Curicó.
Banco Español de Chile.	Banco de Melipille.
Banco Mobiliario.	Banco de Ñuble.
Banco de Santiago.	Banco de Llanquihue.
Banco Popular.	Banco de Arauco.
Banco Nacional.	Banco de Tacna.
Banco de la Republica.	Banco Mercantil.
Banco Union Comercial.	Banco Punta Arenas.
Banco de Talca.	Banco A. Edwards & Co.
Banco de Concepción.	Banco D. Matte & Co.
Banco de la Serena.	Banco José Bunster.

Besides these national institutions there are three foreign banks in the city, viz.:

Banco de Chile y Alemania.	Banco de Tarapacá y Argentina.
Banco Aleman Transatlantico.	

Other banking institutions are the mortgage banks, called Caja Hipotecaria & Banco Hipotecario de Chile, as also the Banco Garantizador de Valores, and the Savings Bank, called Caja de Ahorros de Santiago.

Some of the principal public buildings in Santiago are: "La Moneda" (the Mint), which is the official residence of the President of the Republic and in which are also located a number of executive offices of the Treasury and the Mint; the National Congress, a handsome structure, rectangular in shape and measuring 76 by 78 meters; the "Intendencia" or Municipal Palace; the Palace of Justice; the University; the National Institute; the Museum of Natural History; the Municipal Theater; the San Diego Church, and others.

There are a number of well stocked libraries in Santiago, among which the "Biblioteca Nacional" (National Library) is the most important. This library contains some 120,000 bound volumes, and some 6,500 bound volumes of manuscripts, which are of great historical value, as they have been mostly gathered from the archives of the Inquisition at Lima, from the archives of the Jesuits, the "Real Audiencia" or Royal Tribunal, and from the archives of notary publics, etc. In this Library there is also a fine collection of coins, principally of the American continent, containing now some 600 pieces. The

MUSEUM OF NATURAL HISTORY, SANTIAGO.

The National Museum is situated in the Quinta Normal de Agricultura (Agricultural School Farm), which covers 320 acres. The Museum, a handsome structure of stone and glass, is a reproduction of the Crystal Palace of London, and contains numerous collections of considerable value.

Library publishes a monthly Bulletin, as also the Register of Copyrights and several other publications.

Next in importance is the Library of the National Institute, which possesses some 46,000 bound volumes. The Congressional Library, which was established in 1888, contains some 14,000 volumes, and the Library of the Bureau of Statistics, which contains all the official publications of Chile as well as foreign official and statistical works. Besides these there are a number of libraries pertaining to the different colleges and schools.

The National Museum at Santiago is one of the most complete of its kind in South America, and is especially important for the student of natural history and ethnology.

Other Museums are the Museum of Fine Arts, the Military Museum, and the Museum of Natural History.

The general aspect of Santiago is a curious one to the average American or European because of the fact that the majority of houses are built in the old Spanish style, that is, of one story only, with rooms surrounding a central courtyard or "patio," which is usually ornamented with fountains and flowers. Although there are a number of palatial structures, both public buildings and private residences, built of marble and brick, the material generally used is adobe, or sun-dried brick, covered with plaster of mud, and tinted in different colors. The top is frequently made of Guayaquil cane, the roofs being covered with tile or corrugated iron.

The industrial census of the Department of Santiago, taken in the year 1906, gives the following figures:

RÉSUMÉ OF STATISTICS OF INDUSTRIES IN THE DEPARTMENT OF SANTIAGO.

	Groups of Industries.	No. of Establishments.	Capital.			
			Property.	Machinery.	Working Capital.	Total.
I.	Alcohols, beverages and their preparations	23	$1,156,500	$2,101,800	$ 860,000	$4,118.300
II.	Pottery, ceramic and glassware	5	300,000	609,500	109,000	1,018,500
III.	Alimentaries and their preparations	107	1,627,550	1,596,590	3,625,780	6,849,920
IV.	Illumination, heating and combustibles	8	767,500	1,309,000	1,445,000	3,521,500
V.	Shipyards, etc.	...	.....	.....	.....	.....
VI.	Clothing, etc.	198	608,041	636,273	5,592,400	6,836,714
VII.	Woods and their manufactures.	87	1,097,769	748,936	3,240,114	5,086,819
VIII.	Material for construction....	19	686,550	721,825	725,030	2,133,405
IX.	Textile materials	8	120,000	196,000	937,000	1,253,000
X.	Metals and their manufactures.	130	1,066,734	1,105,360	2,705,836	4,877,930
XI.	Furniture	41	352,000	105,220	1,064,250	1,521,470
XII.	Paper and printed matters...	72	114,000	917,250	836,200	1,867,450
XIII.	Skins and their manufactures.	137	468,000	527,180	7,060,750	8,055,930
XIV.	Pharmaceutical and chemical products	35	413,000	162,000	463,000	1,038,000
XV.	Tobaccos	10	124,000	87,700	315,000	526,700
XVI.	Vehicles	43	540,000	244,000	863,000	1,647,000
XVII.	Sundry industries	128	757,975	595,124	730,589	2,083,688
	Total	1,051	$10,199,619	$11,663,758	$30,572,949	$52,436,326

A Mountain Scene on the Transandine Railway.

The scenery along the line of the mountainous sections of this railroad is as fine as can be found anywhere in the world. The higher peaks of the snow-covered cordillera are constantly in view and an ever-changing panorama of mountain, valley, and gorge is presented to the traveler.

	Groups of Industries.	No. of Establishments.	Production. During Year.	Production. Average.	Raw Materials. National.	Raw Materials. Foreign.
I.	Alcohols, beverages and their preparations	23	$ 9,053,700	$ 6,723,200	$ 2,416,560	$1,691,400
II.	Pottery, ceramic and glassware	5	1,256,000	946,000	786,500	10,000
III.	Alimentaries and preparations	107	20,097,787	17,627,479	12,213,471	278,765
IV.	Illumination, heating and combustibles	8	3,140,000	2,640,000	64,000	942,982
V.	Shipyards, etc.	...	.....	.....	.....	.....
VI.	Clothing, etc.	198	14,040,498	12,307,032	502,671	5,062,171
VII.	Woods and their manufactures	87	5,700,164	4,867,350	2,434,940	363,260
VIII.	Materials for construction	19	1,582,800	1,510,800	159,092	421,600
IX.	Textile materials	8	1,517,200	1,449,000	147,000	801,000
X.	Metals and their manufactures	130	6,395,080	4,973,320	315,953	1,775,665
XI.	Furniture	41	2,590,000	2,279,150	347,646	393,490
XII.	Papers and printed matters.	72	2,692,100	2,435,200	62,500	476,240
XIII.	Skins and their manufactures	137	10,441,600	9,608,700	4,118,822	1,514,324
XIV.	Pharmaceutical and chemical products	35	2,147,900	1,568,500	241,700	267,800
XV.	Tobaccos	10	745,000	631,800	201,500	35,400
XVI.	Vehicles, etc.	43	2,103,200	1,847,300	129,400	492,780
XVII.	Sundry industries	128	2,536,470	1,994,490	150,939	385,155
	Total	1,051	$86,039,499	$83,409,321	$23,692,694	$14,912,072

CALLE DE ESTADO, SANTIAGO.

Calle de Estado is one of the busiest thoroughfares in Santiago, running from the "Alameda de las Delicias" to the principal square, the "Plaza de Armas." It is lined with numerous retail stores, in which can be found all the luxuries of American or European cities.

CHAPTER IV.

PROVINCES AND TERRITORY. SHORT GEOGRAPHICAL SKETCH OF EACH, RESOURCES, ETC., ETC.

The Republic of Chile is divided into 23 Provinces and 1 Territory, as follows (from north to south):

Provinces of Tacna, Tarapacá, Antofagasta, Atacama, Coquimbo, Aconcagua, Valparaiso, Santiago, O'Higgins, Colchagua, Curicó, Talca, Linares, Maule, Ñuble, Concepción, Bio-Bio, Arauco, Malleco, Cautín, Valdivia, Llanquihue, Chiloé, and the Territory of Magallánes.

Considered in their alphabetical order, we have first the Province of

Aconcagua.

Situation. The Province of Aconcagua is bounded on the north by the Leiva and Choapa Rivers, by the Andean mountains on the east, by the Province of Santiago, as also the Province of Valparaiso on the south, and by the Pacific Ocean on the west.

Area and Population. Aconcagua has a population of 128,486, distributed over an area of 14,020 kilometers (5,410 square miles). It is divided into five departments, viz.: San Felipe, Putaendo, Los Andes, Ligua and Petorca.

Topography and Orography. The territory of the Province is composed of numerous low hills and many fertile valleys, which extend along the rivers, crossing the Province from east to west. In this Province there are, however, a number of high peaks, and the Aconcagua, 6,970 meters (22,534 feet) high, is situated close to the border on Argentine territory. The Cuzcuc, 3,922 meters (12,867 feet); Nacimiento, 3,815 meters (12,515 feet); Alto de Laguna, 4,208 meters (13,805 feet); Cerro Azul, 3,420 meters (11,220 feet), and the Juncal, 5,943 meters (19,500 feet), are some of the higher mountains of this Province. Communication with the Argentine Republic is had by means of the Uspallata pass, which reaches an altitude of 3,937 meters (12,910 feet). The railway, which is to connect Santiago with Buenos Aires, will cross the Cordillera at this point, at an altitude of 12,000 feet. Considerable traffic is maintained over this pass at the present time, both passenger and freight, it being the shortest route.

Hydrography. The principal streams in the Province are the Choapa and the Leiva, the latter a tributary of the former; the Petorca, the Ligua, the Putaendo and the Aconcagua, which latter is the largest

HOTEL AND CONSTRUCTION BUILDINGS AT JUNCAL, CHILE.

Juncal is 7,290 feet above sea level, and is the present terminal of the Transandine Railway on the Chilean side. It is also the headquarters of the construction company which is boring the tunnel to complete the line. The hotel affords accommodation to travelers who oftentimes are obliged to spend a night in the mountains while journeying from ocean to ocean.

in the Province. The principal lakes are the Cepo, Conchalí, and Catapilco. Thermal springs abound in the Province and there are also a number of marshes or "esteros."

RESOURCES AND INDUSTRIES. Agriculture and mining are the principal sources of wealth of the Province of Aconcagua. The soil is extremely fertile and the water used for irrigation purposes is rich in fertilizing substances. Cereals of all kinds, as well as different kinds of fruits are cultivated, and rice, tobacco, sugar, beets, hemp, and flax can be advantageously grown. The peaches and figs raised in this Province are noted for their excellency, as is also the grape, of which a good quality of wine is made. A considerable quantity of fruits are exported to the other Provinces, some of which are used for canning.

Copper and silver mines are located throughout the Province, and some gold mines and gold-bearing sands exist in the northern part.

Stock raising and the dairy industry, as well as apiculture are other industries of considerable importance.

In the year 1906 there were 9,043 hectares of wheat under cultivation in the Province, which yielded 116,989 metric quintales; 5,751 hectares of barley yielding 87,653 metric quintales; 728 hectares of corn giving 8,159 metric quintales; 1,425 hectares of beans (frejoles) with 15,373 metric quintales; 1,186 hectares of potatoes with 62,480 metric quintales; 10,302 hectares of alfalfa yielding 349,685 metric quintales of hay.

The cultivation of tobacco has been given some attention in this Province in the last few years, there having been 615 hectares under cultivation in 1906, which yielded 10,755 metric quintales, or a net product of $493.250 *pesos*.

The production of wine in the same year amounted to 69,973 hectoliters, a considerable quantity of which was used in the manufacture of "chicha," the favorite beverage of the Chilean "peon."

A number of metallurgical establishments are located in the Province, chiefly in the departments of Putaendo, Ligua and Petorca.

At Putaendo there are two copper smelting works, having a yearly output of one hundred and twenty-five and five hundred tons, respectively, of regulus.

The copper smelting plant at Ligua has an output of about 300 tons per annum of regulus, there being two mines at this place with a depth of from 75 to 130 meters (246 to 427 feet). The mines at Petorca are worked to a depth of from 57 to 75 meters (187 to 246 feet) and yield from 150 to 200 tons of copper annually.

COMMUNICATIONS. Some 40 highways and numerous roads establish the means of communication and transportation in the Province, and the road over the Andes mountains, via the Uspallata Pass affords communication with the Argentine Republic. Two railways, owned by the Government, traverse the Province of Aconcagua, one, a branch of the Valparaiso-Santiago line, runs from Las Vegas to Los Andes, a distance of 45 kilometers (28 miles), and the other from

the port of Los Vilos to the valley of Choapa, 55 kilometers (34 miles) in length, which is in course of construction, and which, when completed, will connect Los Vilos with Illapel, in the Province of Coquimbo.

ANTOFAGASTA.

Antofagasta, the capital of the Province of Antofagasta, lies on the eastern side of the entrance to Moreno Bay. It is one of the nitrate ports of Chile and is also the principal port of departure and entry for Bolivian products, a railway connecting it with Oruro in Bolivia.

Telegraph lines extend all over the Province and to Bolivia, while an underground cable establishes communication with the Argentine Republic.

DIVISIONS. The Province is divided into five departments, viz: San Felipe, Putaendo, Los Andes, Ligua and Petorca. These departments are subdivided into sub-delegations and communes (comunas). The capital is San Felipe, with a population of 12,000. Other cities of some importance are Los Vilos, which is the port of the Province, with a population of 700; Los Andes with 6,000; Putaendo with 2,500; Ligua with 2,000, and Petorca with 1,000 inhabitants.

San Felipe lies in a fertile valley, north of the Aconcagua River, 125 kilometers (78 miles) distant from Santiago and approximately the same distance from Valparaiso. In San Felipe there is a large flour mill, a brewery, a cordage factory, three banks, and two newspapers.

DISTANCES. San Felipe is distant, by rail, 78 miles from Santiago and Valparaiso.

From Los Vilos to Illapel, in the Province of Coquimbo, it is 36 miles, by rail.

Los Andes to Valparaiso and Santiago, 83 miles, by rail.

Los Andes to Llai-Llai, 26 miles, by rail.

Los Andes is connected by rail with Llai-Llai, a distance of 26 miles, and through this railway, with Valparaiso and Santiago and other points in Chile.

Antofagasta.

SITUATION. The Province of Antofagasta is situated in the northern part of Chile; it is bounded on the north by the Province of Tarapacá, by Bolivia and Argentina on the east, by the Province of Atacama on the south, and by the Pacific ocean on the west.

AREA AND POPULATION. It has an area of 121,300 kilometers (46,830 square miles), with a population of 123,323. It is divided into three departments: Tocopilla, Antofagasta and Taltal. The capital is the city of *Antofagasta,* with a population of about 20,000. It is the principal seaport of the Province, and is important because of its trade with Bolivia, about two-thirds of the total trade, both imports and exports, passing through this port. The city is built on the slope of a mountain, is well laid out, has wide streets lighted by gas. Six miles of street cars are operated in the city of Antofagasta and it has telegraphic communication with the other cities of the Republic. There is also a submarine cable station of the Central and South American Cable Co. at this port. There are two hotels, two hospitals, two daily newspapers, and several clubs at Antofagasta. A railway connects the city with Oruro in Bolivia, a distance of 573 miles. One of the largest silver smelting works in Chile is located at Antofagasta, as also, several nitrate works.

TOCOPILLA. Next in importance to Antofagasta is the port of Tocopilla with a population of about 10,000. It is situated on the Bay of Algodon, extending to the foot of the hills. There are four moles, two for loading copper ore and two for loading nitrate of soda. One of these, the railway mole, is a large iron structure. Vessels are loaded and discharged by means of lighters. Tocopilla is connected by rail with the mining district of Toco, 55 miles distant. The Pacific Steam Navigation and the South American Steamship Company call regularly at Tocopilla, making the run to Valparaiso in four days.

TALTAL. The port of Taltal is about two miles distant from Taltal point and possesses one of the best harbors in Chile. It has a population of about 7,000 and has a considerable trade, being used extensively as a shipping point for minerals of the Province, and is connected by rail with Cachinal, 87 miles distant. The steamers of the West Coast Line call at Taltal about once a month. There are several small hotels, clubs, a church, and three primary schools. The famous "El Guanaco" gold district is near this city.

TOPOGRAPHY AND OROGRAPHY. A series of plains stretch over this Province from the Pacific Ocean to the Cordillera, rising gradually until the Andean region is reached.

The Andean region in this Province reaches some high altitudes, amongst which are the volcanoes of Antofalla, Llullaillaco, Cachi, Pular, Miño, Olca, Lastarria, Juncal, Tria, Licancaur, Lascar, Ollagua and Cabana.

HYDROGRAPHY. The principal river is the Loa, which rises in the southern slope of the volcano Miño, and after having joined its waters with the San Salvador and Salado rivers, disappears through the surface 400 meters (250 miles) before reaching the seashore. Other rivers are the Atacama and Vilama. There are no lakes in this Province, but there are a number of so-called "salares" or "salinas," containing different kinds of salts, nitrates and borax, which constitute the principal resources. The principal borax bed is that of "Ascotan," which is the largest borax deposit in the country. Other important deposits are the "Gran Salar de Atacama," the area of which is estimated at 282,740 hectares (700,000 acres), and the "Punta Negra," some 50,000 hectares (123,500 acres) in extent. The principal salt deposits are located in the territory known as the "Puna de Atacama," and are the "Caurchari," "Rincon," "Arizaro," "Ratones" and "Antofalla." These contain salts of various qualities, according to their respective location, such as saltpeter or nitrate of soda, sulphate of lime, magnesia, several kinds of borates, and common salt.

RESOURCES. Silver, gold, copper, nitrate of soda, iodine, borax and a few minor mineral products constitute the mineral wealth of the province. Agriculture and stock-breeding are practiced to a small extent along the river Loa, especially near Calama.

INDUSTRIES. The exploitation of the mineral wealth of the Province gives life to a number of smelting works and "oficinas," or establishments for working nitrate of soda and its by-products, iodine, sulphate of soda and salt. Two metallurgical establishments are located in the city of Antofagasta for the working of copper and silver ores, the principal one being "Playa Blanca," which is leased to an American company. Other silver and copper smelting works are located at Tocopilla. A number of nitrate "oficinas" are established at Antofagasta, Tocopilla, Toco, Salar and Carmen Alto.

COMMERCE AND SHIPPING. The exports of minerals for the year 1902 is given by the Statistical Department of Chile as follows:

Borax	$ 1,355,200	Copper	$2,694,200	Silver	$547,000
Nitrate	22,257,200	Gold	843,000	Iodine	451,700

making a total of $28,148,300 for the year 1902.

The movement of vessels and tonnage arriving and departing at three ports of the Province, open to foreign commerce, during the year 1906, is as follows:

	FOREIGN.				COASTING.			
	Entered		Cleared		Entered		Cleared	
	No. of Vessels.	Tons.	No. of Vessels.	Tons.	No. of Vessels.	Tons.	No. of Vessels.	Tons.
Antofagasta:								
Steam	212	571,745	213	565,347	483	764,992	484	763,073
Sail	105	151,364	117	187,096	48	46,225	46	40,243
Tocopilla:								
Steam	56	179,391	57	181,397	322	548,868	321	547,270
Sail	47	82,080	4	1,907	42	71,508	4	1,907
Taltal:								
Steam	64	179,111	48	132,327	445	780,483	451	815,798
Sail	48	92,407	45	83,474	27	29,358	31	28,169

COMMUNICATIONS. There are 34 highways in the Province extending in all directions and connecting the several departments and cities with each other and with the neighboring Provinces. There are three railway lines: (1) from Antofagasta to Oruro, Bolivia, which is notable for the altitude it reaches, viz., 4,500 meters (14,765 feet), and also for the fact that it has one of the highest viaducts in the world over the River Loa, being 100 meters (328 feet) in height. The extent of this road on Chilean territory, from Antofagasta to Ollague, is 435 kilometers (165 miles). A branch line, to the nitrate fields of Aguas Blancas, is in course of construction. (2) From Tocopilla to Toco, 88 kilometers (32 miles); and (3) from Taltal to Cachinal, 212 kilometers (75 miles).

Atacama.

SITUATION. The Province of Atacama is situated in the northern part of Chile, and is bounded on the north by the Province of Antofagasta, on the east by the Andean range, by the Province of Coquimbo on the south, and by the Pacific Ocean on the west.

AREA AND POPULATION. The area of the Province is 78,820 kilometers (30,430 square miles), the population being 63,968. It is divided into four departments: Chañaral, Copiapó, Freirina and Vallenar.

PRINCIPAL CITIES. The city of Copiapó, with 12,000 inhabitants, is the capital of the Province. Copiapó lies on the northern bank of the Copiapó River, at the head of the narrow Copiapó Valley, which marks the northern limit of successful agriculture. It is 1,017 feet above sea level. Its streets are wide, but irregular. There is a school of mining situated at Copiapó, as also a number of other schools; two churches, one hospital and four newspapers. Copiapó has a street car line, telegraph and telephones, and is connected by rail with Caldera, 50 miles distant. The Copiapó-Caldera Railway was the first railway ever built in South America; it was commenced in the year 1848 and was opened to the public in 1851. It is a fact worth noticing that the first locomotive of United States manufacture ever exported (1850) was for use on this road. Gold, silver, lead and copper are mined in the surrounding district, and several smelting works are located in Copiapó. Other cities of importance are Vallenar with 9,000, and Freirina with 5,000 inhabitants. The principal port is Caldera, with 2,500 inhabitants, which lies on Ingles Bay, and has a large, well-protected harbor. The port is provided with a number of wharves, the largest of which is the Railway Wharf, 279 feet long and 36 feet wide. Silver and copper smelting works are also located at Caldera.

Tonnage at this port during the year 1906 was as follows: Entered, 164 ships with a total tonnage of 360,958; cleared, 162 ships with 349,409 tons, foreign trade; and 196 vessels with 317,609 tons

entered and 195 tons vessels with 323,227 tons cleared for the coasting trade. Other ports of minor importance are Chañaral, Huasco and Carrizal Bajo, with a population of 2,000, 5,000 and 1,000, respectively. Chañaral is connected by rail with Hundido, 34 miles distant. There are three copper smelting works in Chañaral. The tonnage of the port of Carrizal Bajo for 1906 was as follows: Foreign trade: entered, 53 ships with 104,774 tons; cleared, 2 vessels with 5,136 tons. Coasting trade: entered, 89 vessels with 106,656 tons, and cleared, 140 vessels with 208,496 tons.

Huasco is a small port, principally for the coasting trade. Large vessels anchor in the ocean off shore and the cargo must be handled by means of lighters. There are a number of large copper smelting works at Huasco, copper forming the bulk of the exports. The district is the northern limit of successful vine culture in Chile. Huasco is connected by rail with Vallenar, a distance of 30 miles.

TOPOGRAPHY AND OROGRAPHY. The topographical features of the Province are: its broken territory formed by a series of hills and hillocks, being spurs from the Andes, entirely devoid of any vegetation, and a few narrow valleys extending from east to west.

The Cordillera of the Andes in this Province attains considerable altitude, the principal peaks being San Francisco, 5,573 meters (19,000 feet); Doña Ines, 5,500 meters (18,040 feet); Azufre or Copiapó, 4,500 meters (14,765 feet); Ternera, 4,042 (13,260 feet), and several others. The Come-Caballos pass, 4,500 meters high (14,765 feet), is also located in this Province.

HYDROGRAPHY. There are no rivers of importance in this Province, owing to the scarcity of rain. The only rivers worth mentioning are the Salado, Copiapó and Huasco. Likewise there are no lakes, but a number of "salares," containing nitrate of soda, and other salts, are located in various parts. The largest of these are the "Salar de Pedernales," 29,359 hectares (60,000 acres) in extent, and the "Maricunga," 25,750 hectares (60,800 acres), as also the "Laguna Verde" and "Negro Francisco."

RESOURCES. Minerals are the principal resources and means of wealth of this Province, there being large and valuable gold, silver and copper mines in exploitation. Nitrate of soda, borates, sulphur, lime and common salt are found in the "salares" and are extensively exported. Owing to the lack of rain, agriculture cannot thrive and is only possible in the valleys that can be irrigated. In these valleys fruits and cereals are produced, also an excellent quality of grape, which is used for raisins and rich wines.

INDUSTRIES. The exploitation of the mines is carried on by about twenty smelting works, and a number of nitrate "oficinas," etc.

Algarobilla, the fruit of the Algoraba tree, is an excellent material for tanning, and is largely exported.

Arauco.

SITUATION. The Province of Arauco is situated in the central portion of the Chilean territory, and is bounded on the north by the Province of Concepción and the Pacific Ocean, on the east by the Nahuelbuta Mountains, which separates Arauco from the Provinces of Cautín, Malleco and Concepción; on the south by the Province of Cautín, and on the west by the Pacific Ocean.

AREA AND POPULATION. Arauco has 5,340 kilometers (2,061 square miles), and a population of 61,538. It is divided into the departments of Arauco, Lebu and Cañete. The capital is the port of Lebu, with a population of 3,000, situated at the mouth of the River Lebu. Other cities of importance are Arauco with 3,000, and Cañete with 2,000 inhabitants.

TOPOGRAPHY AND OROGRAPHY. The territory of the Province of Arauco is broken up considerably, containing some heavily wooded patches and several small valleys. The Nahuelbuta mountain range, which runs through this Province from north to south, almost parallel with the Pacific coast, has a few high peaks, amongst which the Pichinahuelbuta is the highest, reaching an altitude of 1,440 meters (4,700 feet).

HYDROGRAPHY. The principal rivers are the Laraquete, Carampangue and Tubul, the course of these rivers being, however, very short, due to the fact that they originate in the Nahuelbuta Mountains and empty into the ocean. The principal lagoons are the Lanalhué and the Lleu-Lleu. There are some mineral springs in the Department of Arauco.

RESOURCES AND INDUSTRIES. Agriculture, cattle breeding and mining are the principal resources of this Province. The islands of Santa Maria and La Mocho, the former in the bay of Arauco, and the latter off the coast of the Province of Arauco, latitude 38° 20′ south, and longitude 74°, are suitable for agriculture and cattle rasing, while mining is practiced principally in the neighborhood of Lota, in the northern part of the Province. Coal and kaolin are the principal mineral products. A number of saw mills are also established throughout the Province, the forests furnishing abundant lumber.

COMMUNICATIONS. There are 13 public highways, as well as a number of private roads and paths and a railway, which connects Arauco with Concepción, having a total length of 91 kilometers (57 miles). A branch of this line extends to Cañete and Lebu. Another railway connects the coal mines of Huenäpiden with the port of Yañez. Four telegraph-lines extend over the Province, and telephone service is established in nearly all the cities of any importance.

CAPITAL. Lebu, the capital of the Province of Arauco, lies on the southern bank of the River Lebu, near its mouth, and is 26 feet above sea level. Two newspapers are published in Lebu. Coasting steamers place Lebu in regular communication with the other ports of Chile, but it is not a regular port of call for the transatlantic liners.

Bio-Bio.

SITUATION. Bio-Bio is situated in the central portion of Chile. It is an inland province, bounded on the north by the Province of Concepción, the rivers Laja and Bio-Bio forming the boundary line; on the east by the Andean Mountains, on the south by the Province of Cautín, and on the west by the Nahuelbuta Mountain range.

AREA AND POPULATION. The Province of Bio-Bio has an area of 12,220 square kilometers (4,718 square miles), and a population of 97,968 inhabitants. It is divided into the departments of Laja, Nacimiento and Mulchen.

CITIES. The capital of the Province is Los Angeles, with a population of 8,000. Los Angeles lies on a plain between the Bio-Bio and Laja rivers, 479 feet above the level of the sea. It is distant 339 miles from Santiago, by rail, and 453 miles from the city of Valparaiso. A branch railway, 12 miles in length, connects Los Angeles with the Chilean trunk line at Santa Fé. A woodworking plant, a tannery, and a brewery are established in Los Angeles. Three newspapers are published. Other important cities are Mulchen with 4,500 inhabitants and Nacimiento with 2,000.

TOPOGRAPHY AND OROGRAPHY. The central portion of the Province is formed by small plains and flat lands, while towards the east and west it becomes mountainous, extending into the Andean and the Nahuelbuta range, respectively.

Some of the high peaks of the Andean Cordillera in this Province are: The Antuco, an active volcano, 2,762 meters high (9,160 feet); the Sierra Velluda, 3,492 meters (11,455 feet); the Campanario, 2,232 meters (7,325 feet), and the volcanoes Callaqui, 2,972 meters (9,750 feet), and the Trapa-Trapa, 2,310 meters high (7,580 feet). There are a number of mountain passes in this Province, the principal one being the Pichachen, at 2,690 meters (8,825 feet) above the sea level, and the Copulhue, at 2,233 meters (7,326 feet) high.

HYDROGRAPHY. The principal river in the Province, and one of the largest in Chile, is the Bio-Bio, which is 256 kliometers (160 miles) in length and is navigable to a considerable extent.

The second largest river in the Province is the Laja, which is 96 kilometers long (60 miles) from its source to its confluence with the Bio-Bio. Other rivers are the Guenco, Duqueco, Bureo and Vergara, all of which are affluents of the Bio-Bio.

There are a number of lakes and lagoons in this Province, the principal one being the Laja Lake, situated in a valley, surrounded by tall mountains, at an altitude of 1,512 meters (4,960 feet) above the level of the sea. This lake is about 5 miles long and one-half mile wide.

There are also a number of thermal springs in the Province.

RESOURCES AND INDUSTRIES. Agriculture and stock-breeding are the principal resources; wheat and other cereals are raised extensively, also vegetables and fruits. An excellent quality of grapes

is raised, which is extensively used in the manufacture of wines, both of the higher grades and of the so-called "chicha." The forests of this Province furnish lumber for building purposes. This is the most southern province in which the vine is cultivated.

COMMUNICATIONS. Numerous highways extend in all directions and establish connection with the other Provinces, while small vessels ply between Liñeco and Nacimiento, 14 kilometers (8½ miles), on the Vergara River and between Nacimiento and Concepción, 40 kilometers (25 miles), on the Bio-Bio. The Central Railway line passes through the Province and has two branch lines, one from Santa Fé to Los Angeles, about 44 kilometers (27 miles), and another between Coigue and Mulchen, 40 kilometers (25 miles) in length.

Postal, telegraph and telephone service are established throughout the Province.

In Mulchen there are a number of saw and flour mills, distilleries, tanneries and other factories.

Cautín.

SITUATION. The Province of Cautín lies in the central section of the Republic, is bounded on the north by the Provinces of Arauco and Malleco, the Argentine Republic on the east, the Province of Valdivia on the south, and the Pacific Ocean on the west.

AREA AND POPULATION. The area of the Province covers 15,920 square kilometers (6,147 square miles), with a population of 139,553 inhabitants. It is divided into the departments of Temuco, Imperial and Llaima. The capital of the Province is the city of Temuco, situated on the northern bank of the River Cautín, with a population of 9,000. Temuco is an important commercial center, and a number of flour and saw mills, tanneries and other factories are established in the city. Other important cities are Nueva Imperial, with 3,000 inhabitants, at the junction of the Cholchol and Carahue Rivers; the port of Carahue with 2,000 inhabitants, situated on the Imperial River, and Lautaro with 3,500 inhabitants.

TOPOGRAPHY AND OROGRAPHY. The territory of this Province is mountainous, the slopes being covered with thick forests, with fertile valleys and plains between which are suitable for agriculture and stock-breeding.

The Andean mountain range on the east of this Province shows a number of volcanoes and high mountains, among which the volcano Llaima is the most conspicuous. The Llaima is 3,011 meters (9,876 feet) and has two large craters in constant activity. Another is the Sierra Nevada volcano, 2,882 meters (7,100 feet) high. In the central part of the Province is the Sierra del Nielol, which is thickly covered with woods. The Nielol ridge follows the right bank of the River Cautín and extends over an area of 44 kilometers in length and 26 in width (27x16½ miles).

HYDROGRAPHY. The principal stream in the Province is the Imperial River, which is formed by the Cautín and Chochol rivers. It is navigable for some 30 kilometers (18½ miles). Other rivers of some importance are the Toltén, having its source in the Lake Villarica and emptying into the Pacific Ocean after a course of about 100 kilometers (62 miles), and the Tirúa, which is partly navigable. There are a number of lakes and lagoons in the Province, among others the Villarica Lake, which has an area of 260 square kilometers (100 square miles), and is situate at the foot of a volcano of the same name, 1,650 feet above sea level. In the center of this lake is a small but thickly wooded island. Other lakes are the Gualletúe and Rucanuco, which latter is the source of the Bio-Bio River. Among the lagoons there are the Rucaico, Caburgua, Pichi-Lafquen, Colico, Budi and Chille.

RESOURCES AND INDUSTRIES. Agriculture and timber are the principal resources of this Province. Wheat and other cereals are produced, as are also different kinds of vegetables. Cattle are also raised, and cheese and butter are manufactured to some extent. The timber cut in this Province is used largely for building purposes throughout the Republic, and there are also some fine cabinet woods.

COMMUNICATIONS. Fifteen highways extend in different directions throughout the Province, and three mountain passes, the Lonquimai, Llaima and Maichi are open throughout the year. The rivers of the Province are navigable to a large extent, and a regular line of steamers plies between Carahue and Valparaiso. A branch of the Central Railway extends from Victoria to Temuco, and from there to Petrufquen and to Antihue, in the Province of Arauco.

Telephone, telegraph and mail services are well organized throughout the Province.

Chiloé.

SITUATION. The Province of Chiloé lies in the southern part of Chile and is entirely composed of islands. It extends from 41° 46′ to 46° 59′ Lat. S. and 73° 30′ to 75° 26′ Long. W. It is bounded on the North by the Province of Llanquihue, from which it is separated by the Canal of Chacao; on the East by the Gulfs of Ancud, Corcovado and the Moraleda channel; on the South by the Gulf of Peñas and by the Pacific Ocean on the West.

AREA AND POPULATION. The Archipelagos of Chonos and Guaytecas and the Island of Chiloé, which together form the Province of Chiloé, cover an area of 22,255 square kilometers (8,600 square miles) with a population of 88,619. It is divided into the departments Ancud, Castro and Quinchao. The capital of the Province is the port of Ancud, also called San Carlos, situated on the eastern shore of the Gulf of Ancud on the island of Chiloé or Isla Grande. The city of Ancud has a population of 4,000 inhabitants.

TOPOGRAPHY AND OROGRAPHY. As stated above, this Province is formed entirely of a number of islands, varying in size and separated

among themselves by various channels of different width. The islands are generally well covered with timber, but are not of very high altitude.

HYDROGRAPHY. There are a number of small streams on the Island of Chiloé, among which the Colu, Chepú and Pudeto and in the Department of Castro the Anai, Coihueco, Gamboa, Notué and Medina. There are also a number of lakes and lagoons on the Island of Chiloé, the largest of which are the Cucao, Huillinco and Queto.

The principal gulfs in the Archipelago are the Gulf of Ancud, between Isla Grande and the mainland, about 120 kilometers (75 miles) in length, and the Gulf of Corcovado, separating the southern portion of the Isla Grande from the Province of Llanquihue, and measuring about 100 kilometers (62 miles). The channel of Chacao, as well as others south of it, are navigated by the large transatlantic steamers that ply between Europe and Chile.

ISLANDS. There are some 300 islands in the Province of Chiloé, the largest of which is the Isla Grande or Chiloé, which measures 185 kilometers (115 miles) in length and has an average width of 45 kilometers (28 miles). Some of the larger islands are the Caucahué, the 16 islands comprising the Chauques group, the Desertores Group of seven islands and others.

RESOURCES. Agriculture is the main natural source of wealth of this Province, although it is not practised to any large extent. An excellent quality of potatoes is raised on these Islands, also cereals and fruits, especially apples, which are used for making cider. The forests are exploited to some extent and timber is cut largely and exported to the other Provinces. The sea abounds in fish and shell fish and fishing is one of the principal industries.

Coal is said to exist in the Province, but has not as yet been mined. Gold bearing sands are found on some of the islands and furnish occupation to a limited number of people.

COMMUNICATIONS. There are 31 highways and a number of paths in the Province, but no railroads have as yet been constructed in any part of the Province. Telegraph and telephone, as well as mail service, are efficient.

CITIES. Besides the city of Ancud, there are the towns of Castro with 2,000 inhabitants, a port on the east side of the Island of Chiloé, and Quinchao, on the island of the same name.

Colchagua.

SITUATION. The Province of Colchagua is situated in the central part of Chile, being bounded on the North by the Provinces of O'Higgins and Santiago, on the East by the Andean Mountain range, on the South by the Province of Curicó and on the West by the Pacific Ocean.

AREA AND POPULATION. The area of this Province is 10,020 square kilometers (3,868 square miles), and the population is 158,160 inhab-

itants. It is divided into the departments of Caupolican and San Fernando. The capital of the Province is San Fernando, with 8,000 inhabitants. San Fernando is situated on the Central Railway and is 83 miles distant by rail from Santiago and 197 miles from Valparaiso. It is connected with Pichilemu, the nearest port, by rail. There is a post office, telegraph office, church, hospital and club in San Fernando, and 3 newspapers are published. A distillery is also located at San Fernando. The other principal towns of the Province are Rengo with 7,000 inhabitants, situated also on the Central Railway. It is 69 miles distant, by rail from Santiago, 183 miles from Valparaiso and 14 miles from San Fernando. In Rengo there is a smoked and dried meat factory. It has a hospital, church, hotel and a high school for boys, and four newspapers. There are two small ports on the coast of this

A CHILEAN VINEYARD.

The wine zone of Chile extends from the Province of Aconcagua as far as the Maule River, some of the vineyards being of considerable extent and producing high class grades of wine. About 80,000,000 gallons are annually produced in Chile.

Province, viz.: Matanzas and Pichilemu, which are dependencies of the Custom House at Valparaiso and are used for coasting trade only.

TOPOGRAPHY AND OROGRAPHY. This Province is composed of a number of plains, becoming mountainous to the West, rising gradually towards the Cordillera de los Andes, which forms the natural boundary of Colchagua. The Andean mountain range reaches some high altitudes in the Province, among which the Alto de los Mineros, 4,935 meters high (16,190 feet), and Tinguiririca volcano, 4,478 meters (14,700 feet), are the most important.

CONCEPCIÓN AND THE BIO-BIO RIVER BRIDGE.

The City of Concepción is beautifully situated on the Bio-Bio River, the largest river in Chile, both in volume and in length. Near the city is the Bio-Bio bridge, seen in the background of this picture, which is 1,738 meters, or 5,700 feet long.

HYDROGRAPHY. The principal rivers are the Cachapoal and its main affluents, the Cortadero, the Claro and the Antívero. The Cachapoel joins the River Tinguiririca and together they form the River Rapel, which empties into the Pacific Ocean. The River Cachapoal measures 164 kilometers (102 miles) from its source in the Andean mountains to its confluence with the Tinguiririca, and the latter 150 kilometers (93 miles).

The largest lagoon in the Province is the Cahuil, which is 15 kilometers (9½ miles) in length and has an average depth of some 800 meters (2,625 feet). This lagoon contains a considerable quantity of salt.

RESOURCES AND INDUSTRIES. Agriculture is the principal industry, due to the fertility of its soil. All kinds of cereals and fruits are successfully cultivated. Mining is second in importance, gold, silver and copper being found, as also coal and gypsum. The level plains of this Province, which are watered by the Rivers Cachapoal and Tinguiririca and by irrigation canals, are especially suitable for agriculture, wheat, barley and corn being grown to a considerable extent. Viticulture is also of considerable importance, the lower grades of wine, called "Chacoli" and "Chicha" being manufactured, as also wine alcohol. Cattle of all kinds thrive here, as also sheep, goats and hogs. The manufacture of butter and cheese, as well as the production of charcoal, are industries of minor importance. There are a number of smelting works in the Province, principally in the valley of Tinguiririca, where copper mines are worked, and in the cañon of the River Teno, where silver is found. Gold mines are said to exist near the coast, and coal has been found on the banks of the River Tinguiririca.

COMMUNICATIONS. The Central Railway of Chile traverses the entire length of this Province, with branch lines from San Fernando to Alcones, 94 miles, and from Pelequen to Peumo, 18 miles.

Telegraph lines as well as telephone service are established in all the towns of the Province.

There are 32 highways and a road across the Andes at a point called the pass of Tinguiririca, which places this Province in communication with the copper district of the Argentine Republic.

Concepción.

SITUATION. The Province of Concepción is situated in the central portion of Chile, between 36° 22′ and 37° 12′ Lat. and 71° 05′ and 73° 12′ Long. It is bounded on the North by the Provinces of Maule and Ñuble, on the East by the Cordillera de los Andes, on the South by the Provinces of Bio-Bio and Arauco, and on the West by the Pacific Ocean.

AREA AND POPULATION. The area of the Province is 9,180 kilometers (3,540 square miles) with a population of 216,994 inhabitants. It is divided into the departments of Coelemu, Puchacai, Rere, Concepción, Talcahuano, and Lautaro.

The capital of the Province is the city of Concepción, with a population of 55,000. It is situated on the banks of the River Bio-Bio, six miles from its mouth in the bay of Arauco, and is the third largest city in the Republic. It has a street railway, and the streets are well paved and lit by electricity. There is a theater, a hospital, several churches and schools in the city of Concepción. Among the latter there is a professional school for women and a normal school for girls.

Industrial establishments are represented by three tanneries, three woodworking plants, 2 flour mills, 1 steam laundry, 1 brickyard, 1 fertilizer plant, 1 furniture factory, 1 carriage factory, 1 straw-hat factory and 1 macaroni factory.

Concepción is connected by rail with Talcahuano, nine miles distant, and thereby with the Central Railway. It is distant 353 miles by rail from Santiago, and 467 miles from Valparaiso. Two newspapers are published and the city is provided with telegraph and telephone service. Concepción is an important commercial city because of its proximity to the coal mines.

Next in importance is the city of Talcahuano, with 15,500 inhabitants. Talcahuano is situated on the bay of the same name and is the largest port of the Province. It is, in fact, one of the best harbors on the coast of Chile, ships of the largest tonnage and draught being able to enter the bay. Talcahuano is on the main line of the Central Railroad and is 362 miles distant from Santiago, by rail, and 474 miles from Valparaiso. Talcahuano is a military port and the Government has built a dry-dock 656 feet long and 70 feet wide. There are warehouses for grain and general merchandise at Talcahuano, as also two steam cranes. Vessels are, however, loaded and discharged by means of lighters. The streets are wide, but irregular, and only the Government docks and buildings are lit by electricity. There is also a whale oil factory at Talcahuano and a cotton bleaching and printing factory at Chiguayante, 20 miles distant. A Custom House, military barracks, a church, hospital, 2 clubs and several hotels are situated in the city. Other cities of some importance are the ports of Tomé, Penco, Lota and Coronel. Lota has a population of 10,000, while Tomé and Coronel have each 5,000 and Penco has 2,000 inhabitants.

Lota belongs almost entirely to the "Compañia Explotadora de Lota y Coronel," which owns large coal mines in Chile. This Company also operates an establishment for refining and smelting copper, a brick and tube factory, a glass blowing establishment, and a dock yard. It also owns a railway between Lota and Coronel, a wharf and several steamers.

Lota is situated on the Arauco Bay, 21 miles south of Concepción. It is connected with Concepción by rail, which latter place is on the Central Railway. It is distant 374 miles by rail from Santiago, and 488 miles from Valparaiso.

The famous Cousiño Park with the handsome residence of the Cousiño family is also at Lota, which was built and laid out by Don

THE CITY OF TALCAHUANO.

Talcahuano, the capital of the Department of the same name, in the Province of Concepción, is situated on Talcahuano Bay, and has one of of the best protected harbors in Chile. It is both a military and a commercial port, and is used for repairs to the Chilean warships, the Government having established a large dry-dock there,

Matias Cousiño, who, in the year 1852, was the first to discover coal at Lota and thereby laid the foundation for the immense fortune of the Cousiño family. In the year 1869 his son, Don Luis Cousiño, formed the Compañia Explotadora de Lota y Coronel, of which the Cousiño family are the principal stockholders. The beautiful Park at Lota is one of the sights of Chile. It was laid out by one of the most skilful landscape gardeners, and is a marvel of artistic design and picturesque effectiveness. It occupies a magnificent site on the bluff overlooking the bay, high above and quite removed from the toil and business of the town.

LOTA, CHILE.

At Lota, the coal port of Chile, in the Province of Concepción, is a long iron pier, at which vessels of twenty-one feet draught can load.

Tomé is situated on the Bay of Talcahuano, at the mouth of the Tomé River, which flows through the town. It is distant 21 miles, by rail, from Concepción. There is a sugar refinery, some flour mills, breweries, distilleries and one cloth factory in Tomé. It is a distributing point for several agricultural centers, and for three coal mines located near Tomé. Large quantities of wine are also exported through this port.

Coronel is situated on a well-protected inlet on the eastern side of Arauco Bay, between the cities of Concepción and Arauco. It is distant 16 miles by rail from Concepción, 369 miles from Santiago and 483 miles from Valparaiso. There are two piers at Coronel and the

port has good anchorage for vessels of any tonnage or draught. A tannery, a flour mill and glass works are established in Coronel and two newspapers are published. Coronel is important because of its proximity to the coal mining district. Coronel is a station of the submarine cable.

Penco is a seaside resort on the bay of Talcahuano, 6 miles east of the port of Talcahuano. It is distant 364 miles by rail from Santiago, and 478 miles from Valparaiso. There are a number of hotels, schools and churches at Penco. There is a large sugar refinery at Penco, in connection with which a distillery is operated, and a shoe blacking factory. The Cerro Verde coal mines are near Penco.

TOPOGRAPHY. The topographical features of this Province are the following: (1) the hilly character of the territory, due to the low spurs extending from the Coast range of the mountains, (2) the damp and marshy lands in the western part of the Province, and (3) the indentations of the coast, formed by the several bays.

There are a number of high peaks in the Province, in the Coast Range, or Cordillera de la Costa, the principal ones being the Colimo, Tomé, Las Tetas, Pompon and Villagrande and the highest peak in the Andean Range in this Province is the Pedernal, 1,918 meters (6,290 feet) above the level of the sea.

HYDROGRAPHY. The Bio-Bio, the largest river in Chile, is the principal stream of the Province of Concepción, with its affluents, the Laja, Laraquete, Itata, Andalien, Vergara and numerous smaller rivers and rivulets.

The Avendaño, 100 meters above sea level (328 feet), is the most important lake of this Province, measuring 5 kilometers (3 miles) in length by 2 kilometers (1¼ miles) and having a depth of 11 meters (36 feet). Some of the more important lagoons are the Tres Pascuales and Laguna Grande or Truminuco.

The coast line of this Province, with a length of 130 kilometers (81 miles), shows a number of points and bays, the principal one among the latter being the bay of Arauco, in which are situated the cities of Concepción, Lota, Coronel and Talcahuano. The island of Santa Maria is situated at the entrance of the bay of Arauco, closing the bay on the East and thus forming a safe anchorage for vessels. It measures 12 kilometers (7½ miles) in length and varies from 1 to 7 kilometers (¾-4½ miles) in width. The Island of Quiriquina, which is situated at the entrance of the bay of Talcahuano, is 5 kilometers (3½ miles) in length and is from 1 to 1½ kilometers (⅔ to 1 mile) wide.

RESOURCES AND INDUSTRIES. Agriculture and coal mining are the principal sources of wealth of this Province. Cattle raising is also carried on to some extent. Viticulture thrives, and a considerable quantity of wine is exported. There are also a number of apiaries and some dairies, where butter and cheese of good quality are produced. The native coal, which is used extensively by the manufactur-

CHILEAN CAVALRY.

There are five regiments of cavalry in Chile, which are excellently mounted, well drilled and equipped. The Dragoons, shown in this picture, are the most popular troops.

ing plants, as well as by the steamship lines of the Pacific, is the most important mineral. Copper is mined to a considerable extent, there being several smelting works at Lota and Coronel.

COMMUNICATIONS. Some 50 highways and a number of passes and private roads place the Province in communication with the other Provinces and with the Argentine Republic. The State Central Railway line connects Concepción with Santiago and Valparaiso, and another state line with Bio-Bio, Malleco and Cautín, while two private lines connect Concepción with the city of Penco and Curanilahue, the former 15 kilometers (9 miles) and the latter 103 kilometers (64 miles) in length.

The River Bio-Bio is navigable up to 150 miles from its mouth and small craft ply between Concepción and Nacimiento.

COAL MINES AT LOTA

The coal mines at Lota, belonging to the Compañia Explotadora de Lota y Coronel, are the largest and most extensive in Chile, producing annually about 300,000 tons of coal.

Coquimbo.

SITUATION. The Province of Coquimbo is bounded on the East by the Andean Mountains, by the Province of Atacama on the North, by the Pacific Ocean on the West and by the Province of Aconcagua on the South.

AREA AND POPULATION. The area of the Province of Coquimbo is 34,880 kilometers (13,465 square miles), with a population of 175,021 inhabitants. It is divided into the departments of Serena, Elqui, Coquimbo, Ovalle, Combarbalá and Illapel.

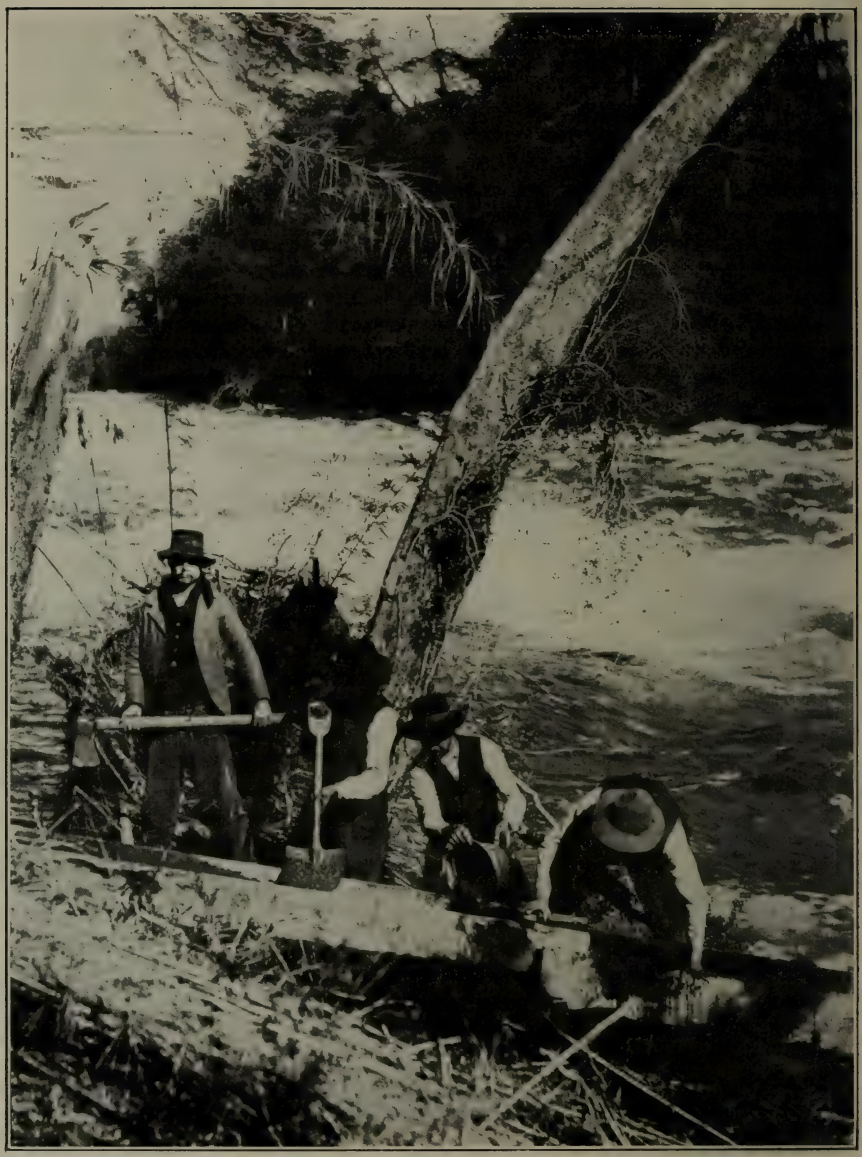
The capital is La Serena, with a population of 19,500. La Serena lies on three terraces ranging from 38 to 98 feet above sea level. It is nine miles distant by rail from the port of Coquimbo. The Court of Appeals is located in La Serena, as also a number of churches, clubs, a theater and hospital. There is also a school of mines and normal school for boys and girls. Two newspapers are published in the city. An olive-oil factory, soap works and tanneries are also in La Serena. Gas works and an electric light plant provide the city with light. Two miles of street cars provide transportation. Telephone and telegraph service are also established. There is an office of the submarine cable in La Serena. It is distant from Ovalle 62 miles and from Vicuna 35 miles. Coquimbo, the principal port of the Province, is the second largest city, with a population of 8,000 inhabitants. Coquimbo is situated on the southern shore of the Coquimbo Bay, 198 miles, by sea, from Valparaiso. It has a well-protected anchorage with an average depth of 48 feet, and a mole, built by the Chilean State Railway. Three smelting plants are located at Coquimbo. The city lies in the midst of the copper mining district. It is provided with gas and water works, telephone and telegraph service and has a number of public schools. Two newspapers are published. It is distant from Vicuna 35 miles, from Ovalle 32 miles and from La Serena 9 miles, with all of which places it is connected by rail. Other towns of minor importance are Ovalle with 5,500 inhabitants, Elqui with 2,500, Combarbalá with 1,200 and Illapel with 3,200 inhabitants each.

Some ports of minor importance along the coast are: Totoralillo, Guayacán, Herradura, Tongoi and Puerto Oscuro, all of which are dependencies of the Coquimbo custom house and are for the coasting trade only, Coquimbo being the only port in the Province engaged in foreign trade.

TOPOGRAPHY. The Province presents a mountainous relief broken by long narrow valleys, which run from East to West, or from the Andes to the Ocean. The soil is usually arid, and not suitable for agriculture, but if properly irrigated cereals, vegetables and fruits can be successfully grown.

The highest mountains in this Province are the Doña Ana, 5,914 meters (19,400 feet), Tortolas, 5,839 meters (19,150 feet) and the Mercenario, 6,793 meters (19,000 feet) high. Other prominent peaks are the Huanta, Andacollo, Juan Soldado and Cerro del Cobre.

HYDROGRAPHY. The rivers in this Province carry, as a rule, a small volume of water, although they are of considerable extent and excellent mediums of irrigation for the country immediately surrounding them. The principal rivers are the Elqui or Coquimbo, 100 kilometers (62 miles) in length, the Limarí, 55 kilometers (35 miles)



GOLD MINING ON THE FRONTIER

Gold is found in Chile in the mountains and hills, as well as in the rivers and streams. The gold bearing sands are often treated by the old method of cradle and pan, whereby a number of people gain a livelihood, while the gold found associated with copper and natural silver is generally mined by large companies and with the most modern machinery.

and the Choapa, 60 kilometers (37 miles) in length, with their respective affluents.

The only lake of any importance in the Province is the Elqui Lake, 3,187 meters above sea level (10,454 feet), covering an area of about 10 square kilometers (4 square miles).

RESOURCES AND INDUSTRIES. Mining is the principal resource of this Province, copper, silver, gold, iron, manganese and sulphur being found in great quantities. There is also a bed of quicksilver and another of lapis-lazuli in the Province. Agriculture and cattle raising is of minor importance, although the Province is able to produce sufficient for its needs, especially along the various rivers, and is even able to export some of its agricultural products. The cultivation of grapes is carried on to some extent and a good quality of wine and brandies are made. There are a number of apiaries and dairies throughout the Province.

COMMUNICATIONS. Aside from the numerous highways, which facilitate transportation, there are several railways, viz.: From La Serena to Coquimbo, 13 kilometers (8 miles), from La Serena to Compañia, 4 kilometers (2 miles), from Coquimbo to Guayacan, 2 kilometers (1½ miles) and from Coquimbo to Puntilla, 93 kilometers (58 miles). All of these are owned and operated by the Government, with the exception of one, which is owned by a private company. Sixty more miles of railroads are in course of construction in this Province. There are a number of mountain passes, which afford communication with the Argentine Republic (called "portillos" ó "boquetes").

COAST. The coast line of this Province extends over 285 kilometers (177 miles) and presents many bays and capes. The largest is the Bay of Coquimbo with the port of the same name.

Curicó.

SITUATION. The Province of Curicó is situated between 34° 30′ and 35° 18′ Lat. and 70° 29′ and 72° 12′ Long. It is bounded on the North by the Province of Colchagua, by the Andean Mountains on the East, the Province of Talca on the South and the Pacific Ocean on the West.

AREA AND POPULATION. Curicó extends over an area of 7,500 kilometers (2,900 square miles) and has a population of 107,090. It is divided into the Departments Curicó, Santa Cruz and Vichuquén. The capital of the Province is Curicó, with 15,000 inhabitants. Curicó lies in the central part of the Province and is 692 feet above sea level. It is distant from Santiago 115 miles by rail and from Valparaiso 229 miles. A theater, 2 hospitals, a club, hotel and a number of churches, as also a number of schools, a college for women, and a high school for boys, are at Curicó. Three tanneries, two flour mills and one brewery are established in the city. Curicó is in the midst of a vine growing district, and has considerable trade with the Argentine Republic,

owing to its proximity to the Planchon Pass. There are also a newspaper and two banks. Other towns of some importance are the port of Llico, which is the only one in the Province, and the town of Vichuquén, both in the Bay of Vichuquén. Llico is only available for the coasting trade, and is a dependency of the Valparaiso Custom House.

TOPOGRAPHY. In the central part of the Province there are large plains and valleys, fertile and suitable for agriculture, while the western and eastern sections present a broken and mountainous aspect. The highest mountains in the Province are the Alto de las Damas, 3,099 meters (10,165 feet) high, and the Planchon or Peteroa, 3,635 meters (11,925 feet), with its three great craters, one of which is still active; the Colorado, 3,954 meters (12,970 feet), and the Cerro de las Cruces, 2,600 meters (8,545 feet). The Planchon Pass over the Andes is north of the mountain of the same name, at an altitude of 3,048 meters (10,000 feet). It is over this pass that most of the cattle is imported from the Argentine Republic.

HYDROGRAPHY. The Teno and Lontué, which unite and form the River Mataquito, are the principal rivers in the Province, as also the River Claro. The River Teno originates in the lake of the same name, situated in the Andes at an altitude of 2,940 meters (9,640 feet). The River Lontué originates near the Cerro Colorado in the Andes, and, flowing in a westerly direction, passes through the Lake of Mondaca. It is about 100 kilometers in length (62 miles).

Besides the Lake of Teno mentioned above, which measures about 5 square kilometers (2 square miles), there are the Lake of Vichuquén, situated near the coast, and the lagoons formed by the estuaries of Boyeruca and Bucalemo. Salt is found in these lagoons, the annual production of which exceeds 25,000 tons.

RESOURCES AND INDUSTRIES. The Province may be divided into two sections, one eastern section between the Andes and the Coast range of mountains, where vegetation is abundant and where cereals and fruits are raised, and a western section, which is chiefly devoted to cattle raising and mining. Copper, silver and gold are found in the mountains, and the exploitation of the salt beds is an industry of considerable importance. In the Andes there are some natural forests, with a good supply of timber, which is used for building purposes and railway sleepers. Viticulture is also practised to some extent in this Province, especially in the district of Curicó. Apiculture flourishes, there being some 18,000 apiaries. Wheat, barley and corn grow in the eastern section, as well as potatoes, peas and beans.

COMMUNICATIONS. The Central Railway of Chile crosses the Province, passing the town of Curicó. Four telegraph lines furnish telegraphic communication.

Linares.

SITUATION. The Province of Linares is situated between 35° 30′ and 36° 30′ lat. S. and 70° 31′ and 72° long. W., bounded on the North by the Province of Talca, on the East by the Andean range of mountains, on the South by the Province of Ñuble and on the West by the Pacific Ocean.

AREA AND POPULATION. The area of the Province of Linares is 10,140 square kilometers (3,914 square miles), with a population of 109,363 inhabitants. It is divided into the departments of Loncomilla, Linares and Parral.

The capital of Linares is the city of Linares, with 8,000 inhabitants. The city of Linares is situated in the center of a valley, 525 feet above the level of the sea, a short distance from the rivers Putagan and Archibueno. It is distant from Santiago by rail 186 miles and from Valparaiso 300 miles. There are a number of primary schools, as also a professional school for women and a high school for boys. A large flour mill is also located in Linares. Two newspapers are published.

REGIMENTAL TRUMPETERS OF THE "CAZADORES."

Other cities of importance are Parral with 8,000 inhabitants and San Javier with 5,000 inhabitants. Parral is situated on the trunk line of the Chilean Railway, and is distant from Santiago 328 miles by rail, and from Valparaiso 442 miles. A branch line extends from Parral to Cauquenes, 38 miles distant. A beet sugar factory and a flour mill are established at Parral. The city of San Javier is situated in a fertile valley at 367 feet above the sea, on the banks of the River Loncomilla. It is a station on the main line of the Chilean Railway and is distant from Linares 19 miles, from Talca 12 miles, and from Cauquenes 40 miles.

TOPOGRAPHY. The topography of this Province shows an uneven and extremely mountainous territory in the East stretching up to and into the Andean range of mountains, and an even, extremely fertile territory towards the West, as far as the boundary of the Province.

The highest peaks in the Andes within the boundaries of this Province are the Cerro de las Yeguas, 3,657 meters (12,000 feet), the Longaví, 3,181 meters (10,435 feet), the Piedra de Iman, which derives its name from the magnetic ores found in this mountain, and the Cerro Florido. The Longaví is visible for a considerable distance, owing to its peculiar, perfectly conical shape. A number of mountain passes are also located in this Province, among which are the "Portillo de Lástimas," Hollada seca, Curillinque, Rio de la Puente, which consists of three distinct passes, and the Longaví.

CHILEAN COWBOYS.

The Chilean cowboy is an excellent horseman, courageous and enduring, and uses the lasso with considerable skill, and with nothing but this lasso he is able to round-up and capture even the wildest animals of his herd.

The principal rivers of the Province are the Maule, and its tributaries, the Melado, which is formed by the Guaiquivillo and the Puente; the Loncomilla, which is formed by the Longaví and the Perquilauquen, and the Archibueno, which is formed by the waters of the Ancoa and some small rivulets.

Some thermal springs are found in the Province, the most notable of these being at Catillo, Panimávida and Vichy-Quinamávida.

VIEW OF PUERTO MONTT.

This prosperous and progressive city, on the Reloncavi Bay, was founded by the Government in 1853. It is the port for the German colony on Lake Llanquihue, about 15 miles in the interior, three-fourths of the population being of that nationality. The bay affords excellent anchorage, and a large trade in lumber, wheat, leather, and other products is carried on. The surrounding country is rich in agricultural products of the temperate zone. A fine view of the Andean range may be obtained from the hills at the rear; the Cabulco Volcano, 22 miles away, being visible on a clear day.

RESOURCES AND INDUSTRIES. Agriculture is well developed, wheat, barley, corn, as well as beans, peas, potatoes and beets being extensively grown, a considerable quantity of which is exported. Viticulture is one of the resources of the Province, wine of a good quality being made and exported, and apiculture is also largely practiced. Cattle and sheep raising and the dairy industry has been given some attention of late and are thriving. Abundant forests are found in the Cordillera, the timber of which can be used for building purposes. Copper and silver are also found in the Province, as well as some gold placers, which give employment to a number of people.

There are three thermal establishments in the Province, located near the thermal springs.

COMMUNICATIONS. The Central Railway crosses the Province, touching at Parral and Linares, thus establishing communication with the other Provinces, and a branch line runs from Parral to Cauquenes, 38 miles. A number of highways connect the different points in the Province with each other, but the rivers are not navigable. Five telegraph lines extend over Linares and postal and telephone communication is well established.

Llanquihue.

SITUATION. The Province of Llanquihue is situated between 40° 16′ and 42° 20′ latitude, and 71° 50′ and 74° longitude, and is bounded on the north by the Province of Valdivia, on the east by the Andean Mountains, and the south by the Province of Chiloé, and on the west by the Pacific Ocean.

AREA AND POPULATION. The area of Llanquihue is 94,900 square kilometers (36,640 square miles), and the population is 105,043. It is divided into the departments of Osorno, Llanquihue and Carelmapu. The capital is Puerto Montt, with 5,000 inhabitants. Puerto Montt lies on the Gulf of Reloncavi, 50 miles northeast of Ancud and 110 miles south of Valdivia. It has a good port, which is sheltered from the storms and winds, although the anchorage is open to the south. The vessels of the Pacific Steam Navigation Company and others make it a regular port of call. There are a number of tanneries, breweries and distilleries established in this city. A custom house, hospital, and a number of schools are also located here, and four newspapers are published.

Other towns of some importance are Calbuco, a small port, and Osorno, with a population of about 5,800. Osorno is the center of an important agricultural and industrial district, being chiefly a settlement of German colonizers, and is the terminus of a railway from Valdivia, 91 miles distant. A railway to Puerto Montt, 78 miles distant, is in course of construction. There are several tanneries, distilleries and packing houses at Osorno.

Calbuco is important because of its canning industry, there being a number of establishments for the canning of fish and meats.

THE PORT OF CALBUCO, CHILE.

Calbuco, situated on the island of the same name, is the capital of the Department of Carelmapu, Province of Llanquihue. A small, but picturesque, strip of water separates the island from the mainland. The city of Calbuco has a good harbor, at which the ships of the "Compañia Sud-Americana de Vapores" call at regular intervals. It is only fifteen miles distant from Puerto Montt.

TOPOGRAPHY. The western part of the Province is mountainous, the Andean range of mountains reaching a considerable height, while on the eastern side of the Province long plains extend, intercepted again by the coast range of mountains.

The highest mountains in the Province are the Rupanco or Puntiagudo, 2,548 meters (7,374 feet); the volcano Osorno, 2,257 meters (6,747 feet); the Tronador, 3,108 meters (10,200 feet) high, and the San Valentin, 3,870 meters (10,100 feet) above sea level. The Tronador is noted for the fact that it is nearly always covered with snow. The volcano Calbuco, situated southeast of the Lake Llanquihue, is only 1,691 meters (5,548 feet) high. The Calbuco is an active volcano, and in the year 1893 an eruption took place, the lava being carried as far as Valdivia, 100 miles distant. Another volcano which is, however, extinct and covered with snow, is the Minchimávida, 2,400 meters (6,790 feet) high.

The principal rivers are the Rio Bueno, with its tributaries, the Rahue and the Pilmaiquen; the Petrohue, which originates in the Lake Todos los Santos and empties into the Gulf of Reloncavi; which originates in the Andes, near the Tronador, and empties into the lake; the Blanco and the Coihuin; the Maullin, the Llico, the San Luis, the Puela and the Comau.

Lake Llanquihue is situated 20 miles north of Puerto Montt, 43 meters (140 feet) above sea level, and is the largest lake in the Republic of Chile. It has an area of 285 square miles and is navigable for small vessels. Puerto Varas, a small town with about 500 inhabitants, is situated on the southern shore of this lake, from which a magnificent view of the snow-capped Osorno is to be had. The slope of the Osorno is covered with woods, which extend as far as the shores of the lake. Some of the other lakes and lagoons in this Province are the Todos los Santos, with an area of 130 square kilometers (50 square miles); the Cayutué, at 225 meters (738 feet) above sea level; the Puyehue, the Rupanco and the Chapo.

The coast of this Province is high and rises suddenly out of the sea. The mountains Melimoyu and Maca, the former 2,580 meters (8,465 feet), and the latter 2,960 meters (9,710 feet) above sea level, are situated on the coast. The Melimoyu is notable for its four peaks, which are always covered with snow. The coast shows a broken line, intercepted at many points by small bays and inlets. The channel of Chacao separates the mainland from the Archipelagos of Conos and Chiloé.

A number of gulfs are formed by the islands belonging to the Province of Chiloé, which are situated close to the southern part of the Province of Llanquihue, and give it its peculiar shape. Among these are the Gulf of Reloncavi, the Gulf of Ancud and the Gulf of Corcovado.

Among the numerous islands along the coast of this Province the principal ones are: Abtao, Lagartija, Queno, Quigua, Calbuco,

Chidhuapi, Tabon, Puluqui, which is the largest, measuring 8 miles in length; the island of Guar, Maillen, Queullin, Chullin, Llancahué and Tenglo.

RESOURCES AND INDUSTRIES. Agriculture, cattle raising and the exploitation of the forests are the principal sources of wealth. Wheat and barley are grown to a considerable extent and exported to the other Provinces, as also potatoes, vegetables and fruits, and especially apples. Numerous apiaries and dairies are also established throughout the Province. The timber cut in the forests is used extensively for building and other purposes and large quantities are shipped yearly to other Provinces.

The washing of gold out of the sand is carried on in different places along the coast, especially at Carelmapu.

COMMUNICATIONS. Highways furnish the means of transportation and communication between the most important points of the Province, and a railway connects Osorno with Valdivia, 148 kilometers distant (92 miles), and a railroad is in the course of construction from Osorno to Puerto Montt. The rivers Maullin and Palena are navigable for a short distance.

A number of mountain passes lead across the Andean Mountains, among which the Perez Rosales, which is north of the volcano Tronador, at 1,083 meters (3,550 feet) above sea level, the Errazuriz and the Bariloche are the most important.

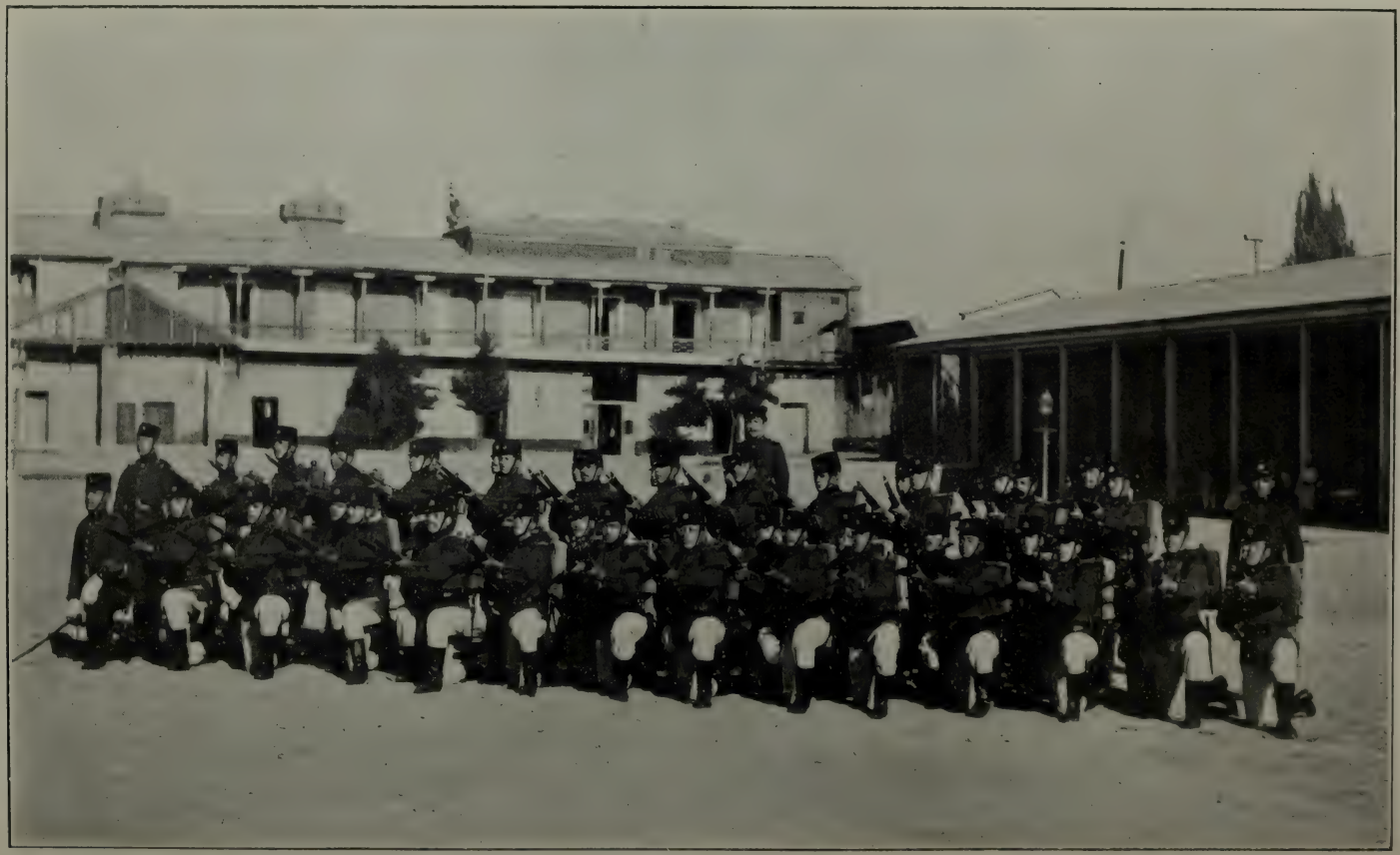
Malleco.

SITUATION. The Province of Malleco is situated between 37° 46′ and 38° 30′ latitude, and 71° 40′ and 73° 10′ longitude, and is bounded on the north and east by the Province of Bio-Bio, on the south by the Province of Cautín, and on the west by the Province of Arauco. It is one of the few inland Provinces of Chile.

AREA AND POPULATION. Malleco extends over an area of 8,060 square kilometers (3,110 square miles) and has a population of 113,775 inhabitants. It is divided into the departments of Angol, Collipuli, Mariluan and Traiguen.

Angol, with 8,000 inhabitants, is the capital of the Province. Angol lies at the foot of the Cordillera de Nahuelbuta, 236 feet above sea level. It is distant, by rail, 356 miles from Santiago and 470 miles from Valparaiso. Angol lies southwest of the Central Railway of Chile and is connected with the same by a branch line, which branch line extends to Traiguen, 43 miles distant from Angol. There are a hotel and club at Angol. A number of schools are located in the city and two newspapers are published. Other important cities are Victoria with 7,000, Traiguen with 6,000, and Collipulli with 4,000 inhabitants.

TOPOGRAPHY. The territory of the Province is mostly composed of long plains, broken up on the eastern boundary by the spurs of the Andean range, and on the west by the Nahuelbuta Mountains. The



BATTALION OF INFANTRY, "YUNGAI."

This battalion is named "Yungai" in honor of the battle fought at that place, on the 20th of January, 1839, and in which the corps distinguished itself and earned its laurels.

highest mountains are the volcanoes Lonquimai, 2,952 meters (9,680 feet), and the Tolguaca, 2,810 meters (9,210 feet) high. The principal rivers are the Renaico, which in conjunction with the Malleco forms the Vergara; the Rehue, the Traiguen with its tributaries, and the Cautín. The latter is the largest stream in the Province.

There are a number of lakes and lagoons of which the Malleco Lake, with an area of about 5 square miles, is the largest. Other lakes of minor importance are Huequen and Lumaco.

RESOURCES AND INDUSTRIES. Agriculture and cattle raising, as well as the exploitation of the forests, constitute the principal sources of wealth of Malleco. Some gold mines have also been found and are being exploited. Wheat, barley and corn, as also potatoes and vegetables are extensively cultivated, and large quantities of grain are exported to the other Provinces. A number of saw mills are established at different points and a flour mill is located at Traiguen. A number of dairies produce a good quality of cheese and butter.

COMMUNICATIONS. Public highways are well laid out and extend all over the Province, and two railway lines are in operation, one from Renaico to Traiguen, via Angol, 93 kilometers (58 miles) in length, and one from Renaico to Temuco (in the Province of Cautín), 142 kilometers (88 miles) in length.

Three mountain passes, viz., that of Coliquen, Pino-Achao and Arco, afford communication with the Argentine Republic.

Maule.

SITUATION. Maule is situated in the central part of Chile between 35° 20′ and 36° 38′ latitude, and 72° and 72° 50′ longitude, and is bounded by the Province of Talca on the north, by Linares and Ñuble on the east, by Concepción on the south, and by the Pacific Ocean on the west.

AREA AND POPULATION. The area of the Province is 6,280 square kilometers (2,425 square miles), with a population of 110,462. It is divided into the departments of Constitución, Cauquenes, Itata and Chanco.

The city of Cauquenes is the capital of the Province, with a population of about 10,000. Cauquenes is situate on the Cauquenes River, 469 feet above sea level. It is distant 356 miles, by rail, from Santiago, and 470 miles from Valparaiso. The city is connected by rail with Parral, 38 miles distant, which latter point lies on the Central Railway of Chile. At Cauquenes there is a horticultural school, as also a number of other schools. Five newspapers are published. It is situated in one of the most fertile vine districts in Chile. The principal port is Constitución, which lies at the mouth of the River Maule, and has a population of about 7,000. It is 208 miles by rail from Santiago, and 322 miles from Valparaiso. It is 13 feet above sea level. A branch railway connects Constitución with Talca, 52 miles distant, thereby establishing connection with the Central Rail-

BRIDGE SPANNING THE RIVER MAULE.

The River Maule is one of the largest of Chile's numerous rivers, rising in the Andes mountains, in the Lake of the same name, and emptying into the Pacific Ocean in Lat. 35° 19′ and Long. 72° 25′. The important town of Constitucion is situated on the southern bank of the River Maule, a short distance from its mouth in the Pacific Ocean.

way. There are some small shipyards in the port. Three newspapers are published. Other towns of some importance are Quirihue, with 3,000, and Chanco with 2,000 inhabitants.

TOPOGRAPHY. The territory is mountainous throughout, the spurs of the coast range extending as far as the boundaries of the Province. Between these spurs are some fertile valleys, irrigated by streams originating in the mountain range.

The only mountains worth mentioning in this Province are the Mingre, 1,200 meters (3,936 feet), and Los Guanacos, 900 meters (2,953 feet) above sea level.

The River Maule, which rises in the Andes and empties into the Pacific Ocean near Constitución, after a course of 175 miles, traverses the Province. This river facilitates transportation to and from Constitución, 52 miles of it being navigable, and makes this port an important commercial center. Other rivers of importance are the Itata, 110 miles in length, of which 20 miles are navigable, and the Purapel and Cauquenes, the latter two emptying into the Perquilauquen.

COAST. The coast line of the province extends from the mouth of the River Maule to that of the River Itata, about 120 kilometers (75 miles) in extent. The coast line of Maule is fairly regular as compared with some of the other Provinces, there being only a few capes and some small bays. Among the capes is the well known Cape Carranza, which is dreaded by navigators, owing to the fact that there are numerous rocks extending for more than a mile into the Pacific, and also because foggy weather mostly prevails at the said Cape. Fourteen miles south of Cape Carranza is Cape Humos, which attains a height of some 300 meters (985 feet). Between these two capes is the bay of Cañas, which, however, is not available for shipping.

RESOURCES AND INDUSTRIES. Agriculture, and especially viticulture, is the main source of wealth of the Province of Maule, although there are some mines and some gold placers. Wheat, barley, corn, potatoes, beans and peas are grown extensively and exported, and a good quality of grape is raised, of which wine is made, which is exported and constitutes the chief source of revenue of the Province. The cattle industry is also developed to some extent, and a number of dairies produce butter and cheese. Honey is also gathered from the numerous apiaries established throughout the Province.

COMMUNICATIONS. Some 50 highways afford transportation, the longest of these being the highway from Constitución to Boca de Itata, 207 kilometers (129 miles) in length. Two branches of the Central Railway, one from Parral to Cauquenes, 50 kilometers (30 miles) in length, and one from Talca to Constitución, 84 kilometers (53 miles), establish railway connection with the rest of the Republic.

The navigable rivers are the River Maule, from the port of Constitución, for about 50 miles, although vessels of over 1,000 tons experience considerable difficulty at low tide, and the River Itata, which is, however, only partially navigable between certain points and for small craft only.

Ñuble.

SITUATION. Ñuble is geographically situated between 36° 8′ and 37° 12′ latitude, and 71° 05′ and 72° 30′ longitude, and is bounded in the north by the Province of Linares, by the Province of Concepción on the south, Maule in the west, and the Andean Mountains in the east.

AREA AND POPULATION. The area of the Province of Ñuble is 6,280 square kilometers (2,423 square miles), with a population of 166,239 inhabitants. It is divided into the departments of Chillan, Yungai, Bulnes and San Carlos.

Chillan, the capital of the Province, has a population of 24,000. Chillan is situated on the Ñuble River, 390 feet above the level of the sea, and is distant from Santiago, 247 miles, by rail; from Valparaiso, 361 miles. It is the sixth largest city of the Republic and is an important mercantile center. Three tanneries, two cask factories, two bread and cracker factories, one foundry and machine shop, one flour mill, brewery, carriage factory, straw hat, perfumery, soap, and butter and cheese factories are located at Chillan. The Government has established an agricultural school in this city, and there are also high schools for both sexes, as well as other schools. Four newspapers are published, and three miles of tramways provide transportation facilities. Telephone service is maintained throughout the city. A large trade in cattle and horses centers in Chillan, and numerous vineyards are in the vicinity.

Other cities of some importance are San Carlos with 8,000 inhabitants, Bulnes with 5,000, and Yungai with 3,000 inhabitants. San Carlos is distant from Santiago 223 miles; from Valparaiso 347 miles. It lies in a fertile vine district. Four newspapers are published in San Carlos.

TOPOGRAPHY. Ñuble may be divided, topographically, into three distinct zones. The first zone, formed by the slopes of the Andean Mountain range, is suitable for cattle raising and contains good timber and pasture lands, the second zone consists of long plains, irrigated by various streams, suitable for the cultivation of cereals; and the third zone, formed by small hills and valleys, is particularly suitable for viticulture.

The highest peaks in this Province are the Nevado de Chillan, an extinct volcano covered with snow, 2,904 meters (9,528 feet) above sea level, the Polcura, 2,408 meters (7,900 feet); the Calabazo, 1,600 meters (5,250 feet).

The principal rivers of the Province are the Ñuble, Chillan, Itata and Cato, with their respective tributaries, the largest of which is the Ñuble, 70 kilometers (45 miles) in length; and the Perquilauquen, with various tributaries, among which the Sauce is the most important.

The famous thermal baths of Chillan are situated in this Province, on the slope of the mountain of the same name, 1,757 meters (3,746

CONSTITUCIÓN, CHILE.

The City of Constitución is the capital of the Province of Maule, lying at the mouth of the River Maule, which latter is navigable for small craft, Considerable quantities of agricultural products from the interior are shipped through Constitución.

feet) above sea level, the waters of which are said to cure rheumatism and gout. A sanatorium has been established at these baths.

The largest lake is the Treguil, 4 square kilometers (1½ square miles) in extent, 1,200 meters (3,400 feet) above sea level.

RESOURCES AND INDUSTRIES. The Province of Ñuble is chiefly an agricultural and stock-breeding country and the industries derived therefrom furnish material and employment to a number of people. Wheat is the principal product of the soil, but barley, corn, potatoes, beans and peas are also grown and the culture of the vine is largely practiced in the western section. Cattle of all kinds, especially sheep, are raised in the Province. A number of tanneries, flour mills, breweries, a machine and tool factory, and cooperages are established. The cutting of timber is also of considerable importance.

COMMUNICATIONS. Besides a number of highways and numerous roads, there is a line of railways which connects the Province with the Central Railway, and connects Chillan and Bulnes with the other Provinces.

Three mountain passes establish communication with the Argentine Republic. These are the Alico, Atacalco and the Portillo passes.

O'Higgins.

SITUATION. Bounded by the Province of Santiago on the north and west, on the east by the Andes, and on the south by the Province of Colchagua, the Province lies almost within the Province of Santiago and its territory extends considerably into that of the Province of Santiago. It is situated geographically between 33° 35′ and 34° 30′ latitude, west, and 70° and 71° 32′ longitude, south, and is one of the smallest Provinces of Chile.

AREA AND POPULATION. The area of the Province of O'Higgins is 5,320 square kilometers (2,050 square miles), with a population of 92,278. It is divided into the departments of Rancagua, Cachapoal and Maipó.

The capital is Rancagua with 7,000 inhabitants. Rancagua is 1,650 feet above sea level and is 51 miles distant, by rail, from Santiago, and 165 miles from Valparaiso. It is situated in an agricultural district. A flour mill and dairy are located in the city. Telephone and telegraph services are maintained. Other cities of importance are Peumo and Buin, with 2,000 and 2,500 inhabitants, respectively.

TOPOGRAPHY. The territory of O'Higgins is mountainous throughout, with some fertile valleys between the mountains. The Andes mountain range continues through this Province, the highest peaks being: the volcano Maipó, 5,947 meters (19,510 feet); San Pedro Nolasco, 3,339 meters (10,950 feet); and the Paloma, 5,072 meters (16,640 feet) above sea level.

The River Maipó, which separates this Province from the Province of Santiago, with its tributaries, the Cruz de Piedra, Barroso Blanco, and Claro, is the principal stream in the Province. The entire

PLAZA DE LA INDEPENDENCIA, SANTIAGO.

The plaza, which is also known as Plaza de Armas, is the promenade of Chilean society, where an excellent band furnishes music in the evenings. The building to the right is the municipal palace, and the statue on the left represents America receiving the baptism of fire of independence.

length of the Maipó, from its source in the Province of Santiago to its mouth in the Pacific Ocean, is 175 kilometers (108 miles). It is not navigable. Another important river in this Province is the Cachapoal, which is formed by the confluence of the Rivers Vegas and Leñas.

The Aculeo Lake, with an area of 40 square kilometers (15 square miles) is the largest lake in the Province. It is noted for the excellency of its fish, the Pejerrey, which find a ready market in the city of Santiago. The Yeso is another lake, situated in the Andean Mountain range.

RESOURCES AND INDUSTRIES. Agriculture is the principal source of wealth of the Province, but mining is also practiced to some extent. Wheat, barley, corn, alfalfa, potatoes and vegetables and fruits are all grown and considerable quantities exported; stock-raising and the dairy industry are thriving and apiculture is also established on a large scale. Fishing in the lakes and rivers affords employment for a number of people. Gold mining is carried on to some extent, and there are also a number of smelting works established in the Province.

Viticulture is carried on extensively and a good grade of wine, as well as the so-called Chicha and Chacoli, are made from the grapes grown here.

COMMUNICATIONS. Forty-six highways covering an extension of 450 kilometers (280 miles) and numerous paths and private roads establish communication between the different points in the Province, and the Central Railway of Chile connects this Province with the others, having stations at Rancagua and Buin; there are also two small local lines for the transportation of agricultural products. A branch line extends from Peumo to the city of Rengo, in the Province of Colchagua, 22 miles in length.

The rivers in this Province are not navigable.

Santiago.

SITUATION. Santiago, the most important of the Provinces of Chile by reason of its industrial and commercial development, is situated geographically between 33° and 34° 12′ latitude, west, and between the Andean Mountains and the Pacific Ocean. It is bounded on the north by the Province of Aconcagua, on the east by the Andes, by the Province of O'Higgins and the Pacific Ocean on the west.

AREA AND POPULATION. The area of the Province extends over 14,820 square kilometers (5,720 square miles), with a population of 516,870 inhabitants. It is divided into the departments of Santiago, Victoria and Melipilla.

The city of Santiago, which is also the capital of the Republic, is the capital of the Province. According to the last census, taken in November, 1907, Santiago has a population of 378,711. Other cities of some importance are San Bernardo, with a population of about 5,000, which is a summer resort with a number of handsome private residences.

A Private Residence in Santiago.

Although the majority of buildings in Santiago are of only one story, and built of sun-dried brick or adobe, there are a number of handsome private residences in the city of palatial proportions. Most of these residences are built on or near the main avenue, the "Alameda de las Delicias," or in the adjacent cross streets.

San Bernardo is 10 miles, by rail, from Santiago, and 124 miles from Valparaiso. It is located in a rich wine district. Four newspapers are published at San Bernardo. Melipilla, on the Maipó River, with about 6,000 inhabitants, is another city of some importance. Melipilla is also situated in a rich wine district and is distant from Santiago 37 miles by rail, and from Valparaiso 151 miles. Four newspapers are published, and telephone service is established throughout the city. It is connected by a branch line with the Chilean Central Railway, providing railway communication with Santiago, and a railway is now in course of construction betwen Melipilla and Valparaiso.

TOPOGRAPHY. The territory of the Province is mountainous in the eastern section, reaching up to and into the Andean Mountains, while the central portion is composed of fertile plains and the coast range of mountains crosses the Province in the west, some of the spurs of which extend to the Pacific Ocean.

The Andean mountain range attains considerable height in this Province and is notable for the uniformity of the range. Some of the highest mountains are the Tupungato, 6,434 meters (21,100 feet); Juncal, 6,151 meters (20,180 feet); the volcano San José, 6,096 meters (20,000 feet); Cerro de Plomo, 5,779 meters (18,950 feet), and San Francisco, 5,573 meters (18,285 feet).

Among the numerous rivers in this Province the Maipó (with its tributaries, the Volcan, Yeso, Colorado, Mapocho and the Negro) is the most important. The Rio Colorado, a tributary of the Maipó, is of especial importance to this Province because of the fertilizing material contained in its waters, which is used for the cultivation of the land. The Maipó is 175 kilometers (108 miles) in length from its source in the Andes, at the foot of the volcano Maipó to its mouth in the Pacific. It is not navigable. The River Rapel is another stream of importance. The most important lakes are the Batuco, the Quilicura, the Negra, the Encañado and the Bucalemo.

The coast of the Province shows a number of bays and capes, among the former the Bay of Chépica. In this bay is situated the only port in the Province, Port San Antonio, of minor importance, as nearly all the trade for Santiago comes via the port of Valparaiso, which is 62 miles distant by rail from the city of Santiago.

RESOURCES AND INDUSTRIES. Owing to its advantageous position in the center of the Republic, as well as to the fertility of the soil and the proximity of the port of Valparaiso, Santiago is chiefly an industrial and commercial Province. Agriculture has been developed to a considerable extent, however, and wheat, barley and corn, as well as wines, fruits and vegetables are produced in abundance. Mining is also carried on to some extent, there being a number of gold, silver and copper mines in the Province. Smelting establishments for silver and copper are at Las Condes and Maipó and also at Tiltil, Lampa and Batuco, where hydraulic lime is also found.

"The Christ of the Andes"—Statue Marking the Boundary Line Between Chile and the Argentine Republic.

This unique statue was unveiled March 13, 1904, with impressive ceremonies. It stands at an elevation of 14,450 feet above sea level. The carriages in the foreground are transporting passengers over the pass between railroad terminals in the two republics. When the Andean tunnels under construction are completed, though the traveler will miss much beautiful scenery, he will be able to cross the continent at any period of the year, instead of being limited to the South American summer, from November to May, as at present.

The following is a list of the more important industrial establishments in the Province of Santiago:

Weaving and knitting mills	15	Chemical products	46
Mattress and quilt factories	11	Soap and candle factories	21
Tanneries	21	Paper factories	2
Shoe and leather factories	45	Starch factories and perfumery, etc.	14
Wood working plants	53	Flour mills	16
Cooperages	18	Bread, cake and cracker factories, etc.	65
Iron Foundries and machine shops	83	Other food products	120
Electrical machinery	2	Breweries	15
Galvanizing plants	7	Cigar and cigarette factories	114
Bricks, tiles and pottery	68		

COMMUNICATIONS. Some 67 highways are in the Province, and the Central Railway extends North and South from the city of Santiago. There is also a branch line from Santiago to Melipilla, 60 kilo-

RAILROAD BRIDGE BETWEEN VALPARAISO AND SANTIAGO.
This railroad was surveyed in 1846 and completed in 1863 by Henry Meiggs. It is now owned and operated by the government. The distance from Valparaiso to Santiago is 42 miles, with a maximum grade of 1,800 feet between the termini.

meters (37 miles) in length, and one from Santiago to Puente Alto, 20.3 kilometers (12 miles). A railway also connects Santiago with the port of Valparaiso, the principal port of Chile, which is 62 miles distant. The line from Santiago to Valparaiso touches at Viña del Mar, El Salto, Quilqué, Limache and Quillota, all of which are noted for their scenic beauty.

Viña del Mar is a popular seaside resort with about 5,000 inhabitants, at which there is also established a sugar refinery, a cocoa oil factory and a tile factory.

Santiago is connected with the Transandine Railway by way of Los Andes, a branch line, 26 miles in length, extending to the latter point. The Transandine Railway will connect Chile with the Argentine Republic when completed.

The principal mountain passes in the Province are the Portillo de Piuquenes, 4,024 meters (13,200 feet); Portrero Alto, 4,064 meters (1,330 feet), and Diamante, 3,838 meters (12,600 feet).

ARTILLERY PARK AND MUSEUM.

The artillery park in the city of Santiago is an imposing edifice rectangular in shape, 400 by 425 feet. Besides accommodations for officers and troops it also contains a military museum, in which are kept the trophies and flags taken in the different wars as also ancient uniforms and armors, etc.

Tacna.

SITUATION. The Province of Tacna is situated geographically between 17° 30′ and 19° 12′ Lat. S. and 68° 45′ and 70° 52′ Long. W. and is the northernmost Province of Chile. It is bounded on the North by the Republic of Peru, by Bolivia on the East, by the Province of Tarapacá on the South and by the Pacific Ocean on the West.

By virtue of a treaty with the Republic of Perú, made in the year 1884, Chile was to occupy the territories of Tacna and Arcia, which

now form the Province of Tacna, for a term of ten years. Chile is administering this Province and has incorporated it into her territory until such time when the matter can be definitely settled.

AREA AND POPULATION. The area of the Province is 24,900 kilometers (8,100 square miles), with a population of 28,748. It is divided into the departments of Tacna and Arica.

The capital of the Province is the city of Tacna, with 10,000 inhabitants. The only seaport of the Province is Arica, with 3,000 inhabitants.

The city of Tacna is an important trade center, considerable imports to and exports from Bolivia being shipped via Tacna and its

EL MORRO, ARICA.

Arica is the northernmost port of Chile and is of considerable importance because of its trade with Bolivia. A railway is being built between Arica and the capital of Bolivia, the city of La Paz. El Morro, a hill 855 feet above sea level, protects the harbor on one side and is fortified.

port Arica. It is situated 1,837 feet above sea level and is connected by rail with Arica, 39 miles distant. A railway from Arica to La Paz, Bolivia, is in course of construction, the first section of which, 40 miles, has been finished. Two newspapers are published in Tacna. There are two establishments for smelting copper ore in the city.

Arica is the most northerly port in Chile and is 881 miles by sea from Valparaiso. It lies on a plain bounded on the Southwest by hills of moderate elevation, the highest of which, El Morro, 855 feet above the sea, is fortified. Arica is the terminus of a road built by the Incas several centuries ago, connecting the port with La Paz, Bolivia, which road is still in good condition and is being constantly used.

TOPOGRAPHY. Tacna is mountainous throughout, with more or less fertile valleys between the different mountains and a larger plain in the Southwest of the Province.

OROGRAPHY. The Andes mountain range, which extends over this Province and literally covers it with mountains, is not as high here as in some of the other Provinces of Chile, but there are a few mountains of considerable height. These are the Parinacota, 6,376 meters (20,919 feet), and the Tacora, 6,019 meters (19,750 feet). Both of these are covered with snow nearly all the year round.

HYDROGRAPHY. The principal rivers in the Province are the Sama, which forms the northern boundary of Chile and Perú, the Tacna or Caplina, which passes through the city of Tacna and fertilizes the valley of the same name, and the Azufre or Lluta. There are a number of creeks in the Province, the largest of which, the Victor Creek, is used for irrigation purposes.

The lakes are the Blanca and the Condorpico, both of which are situated in the Andes, the former at an altitude of 4,200 meters (13,780 feet) above the sea.

The coast line offers a few capes and bays, the principal cape being Point Sama, and the principal bay the Bay of Arica, in which is situated the port of the same name. In the Bay of Arica is also situated the Island of Alacran.

RESOURCES AND INDUSTRIES. Mining is the principal source of the wealth of this Province, although agriculture is practised to a limited extent in the fertile valleys. Gold, silver, iron and copper are found and mined, as also extensive nitrate and salt beds. Vegetables and fruits of various kinds are grown, and viticulture is largely practised, the grapes, which are of excellent quality, being used for the manufacture of wines, spirits and for raisins.

COMMUNICATIONS. Seven highways of considerable length are the principal means of communication of the Province of Tacna, among which is the Inca highway to La Paz, which has been mentioned above.

The only railway is the one connecting Arica with Tacna. Communication with the other Provinces is established only by water through the port of Arica, which is a regular port of call for the transatlantic steamship companies.

Numerous mountain passes lead from this Province to Bolivia, the principal one being the "Sama."

Three telegraph lines furnish telegraphic communication, one being the State telegraph line, the other a private line which extends to La Paz, Bolivia, and the third is the Central and South American Cable Company, which has an office at Arica.

Talca.

SITUATION. The Province of Talca lies between 35° and 36° Lat. S. and 70° 35′ and 72° 25′ Long. W., and is bounded by the Province of Curicó on the North, by the Andean mountains on the East, by the Provinces of Linares and Maule on the South and by the Pacific Ocean on the West.

AREA AND POPULATION. The area of the Province covers 9,700 kilometers (3,745 square miles), with a population of 131,958. It is divided into three departments, Lontué, Talca and Curepto. The capital is the city of Talca, with a population of about 45,000. The city of Talca is situated at an altitude of 351 feet above sea level; it is 155 miles by rail south of Santiago and 269 miles distant from Valparaiso. Talca is provided with three miles of tramways, a telephone service is maintained and three newspapers are published. Three flour mills, three foundries and machine shops, two woodworking plants, a brewery, a tannery, shoe factory, brush and broom factory and cracker factories are established. The city lies in one of the few fertile districts of Talca and is connected by rail with the port of Constitución, at the mouth of the Maule River, 52 miles distant. The Central Railway of Chile passes through Talca.

Other cities of some importance are Molina, with 4,000 inhabitants, and Curepto, with 2,000.

TOPOGRAPHY. The territory of the Province is mountainous in the east and part of the western portion, with long plains in the central and southern part of the Province, occasionally broken by the spurs of the mountain ranges.

The most important peaks in the Province are the Descabezado Chico, 3,330 meters (10,925 feet) high; the Descabezado Grande, 3,888 meters (12,750 feet); the Cerro Azul, 3,760 meters (12,330 feet), and the Campanario, 3,996 meters (13,120 feet) above sea level.

A number of rivers flow from the Andes to the Pacific Ocean through this Province, the largest of which are the Lontué, which, together with the River Teno, form the Mataquito. The total length of the Mataquito is 94 kilometers (58 miles), and it is navigable for about 18 kilometers (10 miles) from its mouth. The River Maule, which is so often mentioned in Chilean history and is one of its most important rivers, flows through a part of this Province and empties into the ocean near the port of Constitución. Some of its tributaries in the Province are the Campanario, Invernada and Claro. The Maule is navigable for about 84 kilometers (52 miles) from its mouth. Some of the larger vessels are able to ascend the river as far as Perales, a small port, 39 miles from Constitución.

The River Maule originates in the lake of the same name, which is 2,194 meters above sea level (8,000 feet), and has an extension of 15 square miles. Other lakes of importance in this Province are the Mondaca, situated in the Andean mountains at 1,478 meters

(5,850 feet), and the Invernada Lake, south of the Cerro Azul Mountain, at 1,355 meters (4,425 feet) above sea level, the former having an area of 1 and the latter 1½ square miles.

Thermal baths in this Province are situated at different points in the mountains, viz.: the Mondaca Springs, on the southern shore of the Lake Mondaca; the Campanario Springs, near the mountain of the same name, and the Maule Springs, at about 130 meters (425 feet) from the Maule Lake. These hot springs have a temperature of from 82° to 110° Fahrenheit and contain a large percentage of sulphate of soda and iron.

RESOURCES AND INDUSTRIES. Cattle raising and the cultivation of cereals, fruit trees and vines are the principal industries in the valleys and fertile plains of the Province, while the exploitation of the forests and of the gold, silver and copper mines, as well as the extensive sulphur beds in the Cordillera, are industries of minor importance. Viticulture is of considerable importance, a good grade of wine being made and shipped to the other Provinces and to Bolivia.

COMMUNICATIONS. Twenty-two public highways establish communication in the Province, as also a number of private roads and paths. The Central Railway of Chile connects the city of Talca with the other Provinces of the Republic and a branch line connects Talca with the port of Constitución, in the Province of Maule.

The Rivers Maule and Mataquito are the only navigable rivers in the Province.

Tarapacá.

SITUATION. The former Peruvian territory of Tarapacá was annexed by Chile in the year 1884, by virtue of a treaty with Perú, and the Province of Tarapacá was created by the Chilean Congress on October 31, 1884. Geographically it is situated between 18° 30′ and 21° 40′ Lat., and 68° 20′ to 70° 15′ Long., and is bounded by the Andean mountain range on the East, which forms the natural boundary line with Bolivia, by the Province of Tacna on the North, by the Pacific Ocean on the West and by the Province of Antofagasta on the South.

AREA AND POPULATION. "The great desert of Tarapacá," as it is commonly called, is one of the largest Provinces of Chile, having an area of 47,680 kilometers (18,400 square miles), with a population of 110,036.

It is divided into two departments, Pisagua and Tarapacá. The capital of the Province is the port of Iquique, with a population of 38,000. Iquique is one of the most important ports of Chile, and its export trade is greater than that of any other port in Chile, owing to the fact that nearly all the nitrate of soda produced in Chile is shipped through it. It is situated on a wide, sandy plain at the level of the sea, and is surrounded by a line of hills ranging from 2,300 to 2,600 feet in height. Although the harbor is but an open anchorage place, it is one of the safest in Chile, owing to this range of hills. A number

of nitrate works, woodworking plants, soap factories, a water distilling plant and railway shops are established at Iquique. Ten miles of tramways furnish transportation throughout the city, and telephone and telegraph service is maintained. Four newspapers are published. A number of hotels, clubs, hospitals and a theater are also located at Iquique, as also a professional school for women, a high school for boys and one for girls and several other schools.

The rich silver mines of Huantajaya are only ten miles distant from Iquique. Iquique is connected by rail with Pisagua in the north and with Lagunas in the south. Pisagua is the second largest city and port in the Province, with a population of about 5,000. Ports of minor importance are Caleta Buena and Junin, dependencies of the Custom House of Iquique.

CALICHE AT THE CRUSHER.

From the crude "caliche," or nitrate rock, from fourteen to fifty per cent of nitrate of soda is obtained, while iodine, sulphate of soda, sodium chloride, potash, magnesium and lime form the rest of the rock.

TOPOGRAPHY. The territory of the Province of Tarapacá can be divided into five different zones, each with its own peculiar topographical features.

The first zone extends from the shore west as far as the coast range of mountains. It contains the valuable guano deposits which have in the past, and are still, yielding a considerable revenue to Chile.

The second zone extends from the coast range to the Tamarugal plains, and is composed of mountain ranges and valleys and plains. In this district there are a number of mountains of from 1,000 to 1,800

meters (3,280 to 6,000 feet), the highest being the Carrasca, 1,833 meters (6,070 feet), and the Oyarvide, 1,767 meters (5,900 feet). In this zone is situated the valuable silver mine of Huantajaya and Santa Rosa and the copper mines of Chanavaya and Paiquira. The nitrate and salt deposits are located in this zone. The nitrate belt proper may be said to extend from 19° 15′ Lat. and 70° 10′ Long. east to Lat. 21° 20′.

The third zone is formed by the vast plains of Tamarugal. This is an immense desert, absolutely barren, which is composed partly of sandy and partly of salty soil, in which vegetation is impossible. In this zone there are also a number of the so-called "salares" or "salinas," containing valuable deposits of various kinds of salts.

The fourth zone is formed by the spurs of the Andean mountains, with occasional valleys between them, and some large ravines, formerly the beds of rivers, in which a number of small villages and habitations have been established, dependent more or less on the volume of water flowing from the Andes through these ravines.

The fifth zone, finally, is composed of the Andean mountain range, as far as the Bolivian boundary line. The highest altitudes in the Province of Tarapacá are the Lirima, 6,000 meters (19,685 feet); the Mamaguanapa, 5,480 meters (17,980 feet); the Tata-jachura, 5,170 meters (16,960 feet), and the Isluga, an active volcano, 5,000 meters (16,400 feet) high.

The only streams of any importance in this Province are the Camarones and the Loa Creek, there being no navigable rivers in the Province. In fact, the lack of water is one of the greatest drawbacks to the Province, and one from which the inhabitants suffer considerably in times of drought.

The dry climate and the lack of rain, on the other hand, favors and makes possible the large salt and nitrate deposits, which constitute the principal wealth of Tarapacá.

The twin lakes, Lirima or Chuncara, are the only lakes of any importance, the larger of these measuring 480 meters (1,575 feet) from east to west and 180 meters (600 feet) from north to south. Huasco, Parinacota and Curaña are some of the smaller lakes.

The island of Serrano, with an area of 139 square miles, and the three little islands called "Islotes de Patillos," as well as the two little islands called "Islas de los Pajaros," are the principal deposits of guano. All of these islands are situated but a short distance from the coast of the Province of Tarapacá.

RESOURCES AND INDUSTRIES. The principal, and practically the only, source of wealth of the Province are the various minerals, Tarapacá being one of the richest mining districts in the world. The abundant deposits of nitrate are, of course, the main source of wealth and numerous nitrate "Oficinas," as they are called, are established throughout the Province, and give employment to some 20,000 men. There are, however, many other minerals found in Tarapacá, among them being silver,

CRUSHING MACHINERY.

The "caliche," in which the nitrate of soda is contained, is first crushed by the machinery shown above and then run into huge boiling tanks, where the salts are separated from the sand and other matter.

copper, iodine, borax and various kinds of salts. Guano is another important product, it being found chiefly on the islands along the coast. Agriculture is carried on to a very limited extent, being possible only in the small valleys along the various creeks. The industry, however, does not produce sufficient to supply the needs of the inhabitants of the Province, and thus it is that the Province, which produces the largest share of the best-known fertilizer of the world, is itself dependent on the other Provinces of Chile for its supply of articles of food. In fact, practically everything has to be imported from the other Provinces, and it is only recently that the railways have extended their lines to the several oases, thus making it possible for the inhabitants to obtain their drinking water, which, up to a few years ago, had also to be brought from the other Provinces.

COMMUNICATIONS. A number of highways establish communication between the principal points and the mining districts, and a railway extends from Pisagua to Iquique and thence to Lagunas, with branch lines to Junin, Caleta Buena and Patillo, which railway connects the nitrate centers with Iquique and the different ports. There are no navigable rivers in the Province. Several passes lead over the Andes to Bolivia, among them being the one from Sibaya, from Chusmisa and one from Mamiña.

Valdivia.

SITUATION. The Province of Valdivia is one of the central Provinces of Chile and is situated between the Provinces of Cautín and Llanquihue and the Andes and the Pacific Ocean, or between Lat. 39° and 40° 38′ and Long. 71° 10′ to 73° 44′.

AREA AND POPULATION. It covers an area of 21,740 kilometers (8,011 square miles), and has a poulation of 119,277 inhabitants. It is divided into the departments of Valdivia and Union. The capital is the city of Valdivia, with 8,500 inhabitants. It is situated on the bank of the river of the same name, 23 feet above sea level, and is distant 437 miles, by sea, from Valparaiso, and 12 miles from Puerto de Corral, which latter is the port of Valdivia. Valdivia is connected with Puerto de Corral by two channels, one 12 miles and the other 22 miles in length, which are used for the transportation of merchandise to and from the Port. There are six hotels in Valdivia, as well as a hospital, a number of schools, and three newspapers are published. It is an industrial center, it being one of the largest German settlements in Chile. These Germans have founded numerous industries. There are 22 tanneries, seven distilleries, six slaughter houses, five flour mills, four breweries, four saw mills, three copper works, and a number of other establishments such as machine shops, coppersmiths, printing establishments, etc., etc.

There is also a ship yard and an electric light plant in Valdivia. A railway connects the city with La Union and Osorno, 92 miles distant.

A Brewery in Valdivia.

Valdivia was founded by Pedro de Valdivia in 1552, and is at present the site of the most important German colony in Chile. It is situated in southern Chile on the banks of the Valdivia River about 12 miles from its seaport town of Corral and 407 miles by sea from Valparaiso. The city has a population of 12,000 inhabitants and is connected by railroad with Santiago and with the more southerly cities of Osorno and Puerto Montt.

La Union, with 3,000 inhabitants, and Rio Bueno, with 1,500 inhabitants, are the other cities of some importance in the Province.

TOPOGRAPHY. The general topographical features of this Province may be described as two mountain ranges, on the East the Andes and on the West the Cordillera de la Costa, with a fertile valley between them, broken up, however, by the numerous spurs of the two mountain ranges and with many lakes and rivers. The slopes of the mountains are covered with forests.

The volcano Villarica, the Quetropillan, and the Riñihue are the highest mountains in the Province. They are of 2,839 meters (9,315 feet), 3,688 meters (12,100 feet) and 2,659 meters (8,725 feet) high, respectively. The Panguipulli is of minor height, but is noted for the fact that it is always covered with snow and therefore visible for a considerable distance.

The numerous rivers and creeks which flow through this Province are extensively used for irrigation purposes, and are also of great use as a means of communication, some of them being navigable to a considerable extent. The largest rivers in the Province are the Tolten, with its tributaries, the Queule and the Valdivia or Calle-Calle, with a total length of 122 kilometers (75 miles), and with a number of important affluents, the largest of which is the San Jose or Cruces, which itself receives a number of tributaries, and divides its waters into two arms shortly before its juncture with the Valdivia, thus forming the small island of Teja. The Rio Bueno, with a total length of 130 kilometers (80 miles), which also receives a number of tributaries, some of which, such as the Pangueco, Rabistron, Traiguen and Llollelhue, are of considerable importance.

The Province of Valdivia is notable for the number and size of its lakes. Some of the largest of these are the Villarica, the Calafquen, also called Frailafquen, situated at the foot of the volcano Villarica, which has an extension of 48 kilometers (29 miles), and has seven little islands. The River Panguipulli connects this lake with the Panguipulli Lake, 15 kilometers (9 miles) distant. The Panguipulli Lake measures 70 square kilometers (27 square miles). The Villarica has an extension of 250 square kilometers (85 square miles). Other lakes are the Periguaico, the Lacar, the Riñihue and the Ranco, Puyehue, Maihue and Riñinahue. Of these the Ranco is the largest, having an area of 508 square kilometers (193 square miles).

RESOURCES AND INDUSTRIES. Agriculture, cattle raising and the exploitation of the forests are the principal sources of wealth and furnish the materials for a number of manufactories, such as the tanning of hides, the slaughtering of animals, the preparation and working of the various woods, the distillation of liquors and the preparation of alcohol and the brewing of beer. A number of valuable trees, such as the lingue, the temu, the pelu and the chinchin, used extensively for cabinet work and for furniture, shipbuilding, etc., are also found in this Province.

HARBOR OF VALPARAISO, CHILE.

Valparaiso, the trade center of the Pacific Coast, has an excellent harbor, affording shelter and accommodation for the largest vessels. The bay is crescent shaped, and is protected on the south and west by hills. The Chilean Government is spending over $10,000,000 for the improvement of the harbor.

Wheat, barley and potatoes, as well as vegetables and fruits of various kinds, are all grown to a limited extent.

The dairy industry is fairly well developed, and a considerable quantity of butter and cheese is made in the Province, some of the latter being exported to other Provinces. Apiaries are also established, and a considerable quantity of honey is obtained. Viticulture is practised to some extent, the grape being, however, of an inferior quality and mostly used for the manufacture of chicha and alcohol.

COMMUNICATIONS. A railway connects Valdivia with La Union, in the same Province, and with Osorno in the Province of Llanquihue, 147.5 kilometers in length, (90 miles). A railway is also under construction from Temuco in the Province of Cautin, which is at present the end of the State Central Railway, to Valdivia, which will place Valdivia in communication with the other Provinces.

There are 200 miles of navigable rivers in the Province, the River Bueno being navigable for 87 miles from its mouth to Trumao, the Valdivia River for 33 miles inland, and the Tolten for small craft up to the Villa Rica Lake and to the town of the same name. The Ranco Lake is also navigable for small craft.

Three passes over the Andes, namely, the Villarica, the Ranco and the Riñihue Passes, establish communication in this Province with the Argentine Republic. The Villarica Pass is open even in winter, when most of the other passes are closed to traffic, and furnishes an easy access to the city of Mendoza in Argentina, while the Ranco Pass leads to the Argentine Patagonia.

Valparaiso.

SITUATION. Valparaiso is situated between 32° 37′ and 33° 29′ Lat. W. and 71° and 71° 45′ Long. S. of Greenwich, and is bounded by the Province of Aconcagua on the North, and part of the same Province on the East, as well as by part of the Province of Santiago, by the latter Province on the South and by the Pacific Ocean on the West. It is situated on the coast, surrounded in a semi-circle by the Provinces of Aconcagua and Santiago, and is the smallest Province in Chile.

AREA AND POPULATION. Although the smallest Province in extension, having an area of 5,020 kilometers (1,930 square miles) only, it is one of the most populated Provinces of Chile, with a population of 281,385, being second only to the Province of Santiago, and having the largest population per square mile.

It is divided into four departments, viz.: Valparaiso, Casablanca, Limache and Quillota. The capital is the city and port of Valparaiso, with 200,000 inhabitants. Valparaiso is the principal port, not only of Chile, but of the entire west coast of South America. It is situated about midway between the northern and southern extremities of the Republic, and is 62 miles west of Santiago, the capital. Valparaiso is distant from San Francisco 5,140 miles, and from New York 8,460 miles.

The bay of Valparaiso is fully protected on the south and west, being open only on the north, and strong winds and storms coming from that direction occasionally do damage to ships lying in the harbor. There is a Custom House Wharf, 771 feet in length, at Valparaiso, at which the smaller vessels can anchor, but the larger vessels are obliged to anchor off shore and load or discharge by means of lighters. Warehouses and Custom House sheds provide ample facilities for the storage of merchandise and there are also two wooden floating docks, which are able to take steamers of 3,000 and 1,800 tons, respectively.

The city itself is built on 19 hills, varying from 300 to 1,100 feet in height, some of which are separated by deep ravines, which has necessi-

CHILEAN FIELD ARTILLERY.

tated the building of many bridges. The level ground along the sea coast covers only a narrow strip, not more than one-half mile in width at any point, and a number of winding roads, stairways and lifts lead up to the city proper. There are a number of Government buildings, as well as hotels, banks, theaters, schools, churches, etc., in Valparaiso. There are also two public libraries, a Museum of Natural History and a Naval Academy. Ten newspapers are published. Numerous factories, such as iron foundries and machine shops (two of the former employing over five hundred persons each), tanneries, woodworking plants, canning factories, soap and perfumery factories, flour mills,

furniture factories, a galvanized iron plant and others are located in the city, among which a whale oil and a linseed oil factory deserve especial mention. The largest sugar refinery in Chile is situated about six miles from Valparaiso.

Valparaiso is the northern terminus of the Chilean Central Railway, which places it in communication with Santiago and all other points South as far as Osorno. It is likewise connected with the Transandine Railway, which, when completed, will afford transportation to Mendoza and Buenos Aires in the Argentine Republic. It is the headquarters of the Chilean Navy and the terminus of several European steamship lines, as well as the lines from Panama. It is the center of the Chilean

STREET MERCHANT.

Horses are extremely cheap in Chile and therefore everyone, even the poorest "peon," owns his own horse. The picture shows a street vender in the act of selling his wares.

coast trade. Telegraphic and cable service are established and telephone service is maintained throughout the city as well as with the neighboring towns of Viña del Mar, Limache, Quilqué, etc. Electric street cars facilitate transportation in the city.

The water supply of Valparaiso deserves mention because of the difficulties that had to be overcome. The city receives its supply of drinking water from the Peñuelas Water Works, situated on the Pla-

cilla Plateau, eleven miles distant from the city. The reservoir lies 1,180 feet above sea level and has an area of 4,285 acres, with a capacity of over 19,000,000,000 gallons of water. A dam, 1,500 feet long and 55 high, was built around the Placilla Plateau, which forms a natural basin, and from this reservoir six 30-inch pipes convey the water to the filter beds, 42 feet below. There are six of these filter beds, and a number of pipes convey the water from them to the main aqueduct, which in turn conveys it to the distributing tanks on Vigia Hill. It is then distributed throughout the city by four miles of piping.

The Chilean Government has recently contracted with a French firm for the improvement of the harbor, which has long been a drawback to shipping, owing to its being open on one side and subject to violent storms, and the damage done by the last earthquake has rendered shipping and commerce even more difficult.

The work to be done by the said company comprises the building of a breakwater 1,000 meters (3,280 feet) in length, docking facilities for the ships, which is to be sufficient so as to enable all the vessels entering the harbor to land at the docks instead of having to discharge into lighters; roads to connect the docks with the city and all the necessary machinery and equipment for handling the merchandise.

This work is to be entirely completed in seven years from the date of the concession, which is September 12, 1908.

Other cities of importance in the Province are Quillota, with 18,000, Limache with 6,000 and Viña del Mar with 5,000 inhabitants. The latter is a famous seaside resort, and is also noted for the excellent quality of wine produced in the neighborhood.

Quillota is situated on the Aconcagua River, 420 feet above sea level. It is 34 miles distant, by rail, from Valparaiso and 80 miles from Santiago. It lies in an agricultural and fruit raising district, viticulture being very largely practised near the town. Telephone service is maintained and four newspapers are published. There are two breweries, a tannery and a paper mill and several other minor factories. The beds of lime situated near the city are used for the manufacture of Portland cement.

TOPOGRAPHY. The territory of the Province is largely composed of valleys and plains, broken up, however, by the ridges and spurs of the two mountain ranges, the Cordillera de la Costa and the Cordillera de los Andes.

Neither of these mountain ranges attain any considerable height in this Province, the highest mountains being the Melon and Curichilonco, 2,212 meters (7,257 feet); the Cerro del Roble, 2,210 meters (7,250 feet), and the Campana, 1,942 meters (6,375 feet) high.

The only river of any importance is the River Aconcagua, which traverses the Province for 60 kilometers (37 miles), receiving a number of small creeks in its course.

ISLANDS. The famous group of islands of Juan Fernandez, consisting of the three islands "Mas a tierra," "Mas a fuera" and " Santa

Bay and Harbor of Valparaiso, Showing the Custom House.

Clara," belongs to the Province of Valparaiso. The islands are famous because of the fact that Devoe makes it the scene of his world-famous novel, "Robinson Crusoe." The island called "Mas a tierra" is the largest of the group, having an area of 93 kilometers (35 square miles) and being distant from Valparaiso 670 kilometers (416 miles). The Yunque is the highest point on the island, being 927 meters (3,040 feet) above sea level. Cereals and all kinds of fruits are grown, especially cherries and strawberries. The woods contain some good and useful kinds of trees, such as the Roble, the Luma, the Chonta and the Sandalo. Good fishing is also to be had. It has a population of about 60 inhabitants.

The "Mas a fuera" island is situated, as its name indicates, further away from the coast, being 160 kilometers (100 miles) west of the "Mas a tierra" island. It has an area of 84 square kilometers (32 square miles), and its highest point is 1,840 meters (6,036 feet). It consists of a mass of rock with but very little vegetation. Wild goats and rock-doves are abundant on the island, and also a species of savage dogs, and all kinds of fish as well as a kind of lobster ("Langosta") are to be found in the waters.

The small island of Santa Clara is situated about 1½ miles Southwest of the "Mas a tierra" Island and is 4 to 5 kilometers (2½ to 3 miles) in length and 2 to 3 kilometers (1¼ to 2 miles) wide, the highest point being 374 meters (1,227 feet). It is barren and desolate and difficult of access.

RESOURCES AND INDUSTRIES. Commerce is the most important source of wealth of this Province, owing to the port of Valparaiso being located within its boundaries, which is the commercial center, not only of Chile, but also of the neighboring Republics. Agriculture is practised to some extent in the valleys and plains, wheat, barley and alfalfa being grown, as well as potatoes and vegetables and fruits of various kinds. Viticulture is one of the important sources of wealth, and a good grade of wine is made, some of which is exported to the other Provinces, especially Santiago.

Cattle raising and the dairy industry are other sources of wealth, and mining is carried on to a limited extent, there being some copper and silver mines and also gold bearing sands.

COMMUNICATIONS. A number of highways connect the more important points with one another, the principal one being from Valparaiso to Santiago, 155 kilometers (96 miles) in length. A railway connects Valparaiso with the main Central Railway and thereby with the capital and other points North and South, as well as with the Transandine Railway. This railway stops at the more important towns in the Province, viz.: Viña del Mar, Quilpué, Quillota, Calera and Llai-Llai, it being 184 kilometers (115 miles) in length.

There are no navigable rivers in the Province.

Territory of Magallanes.

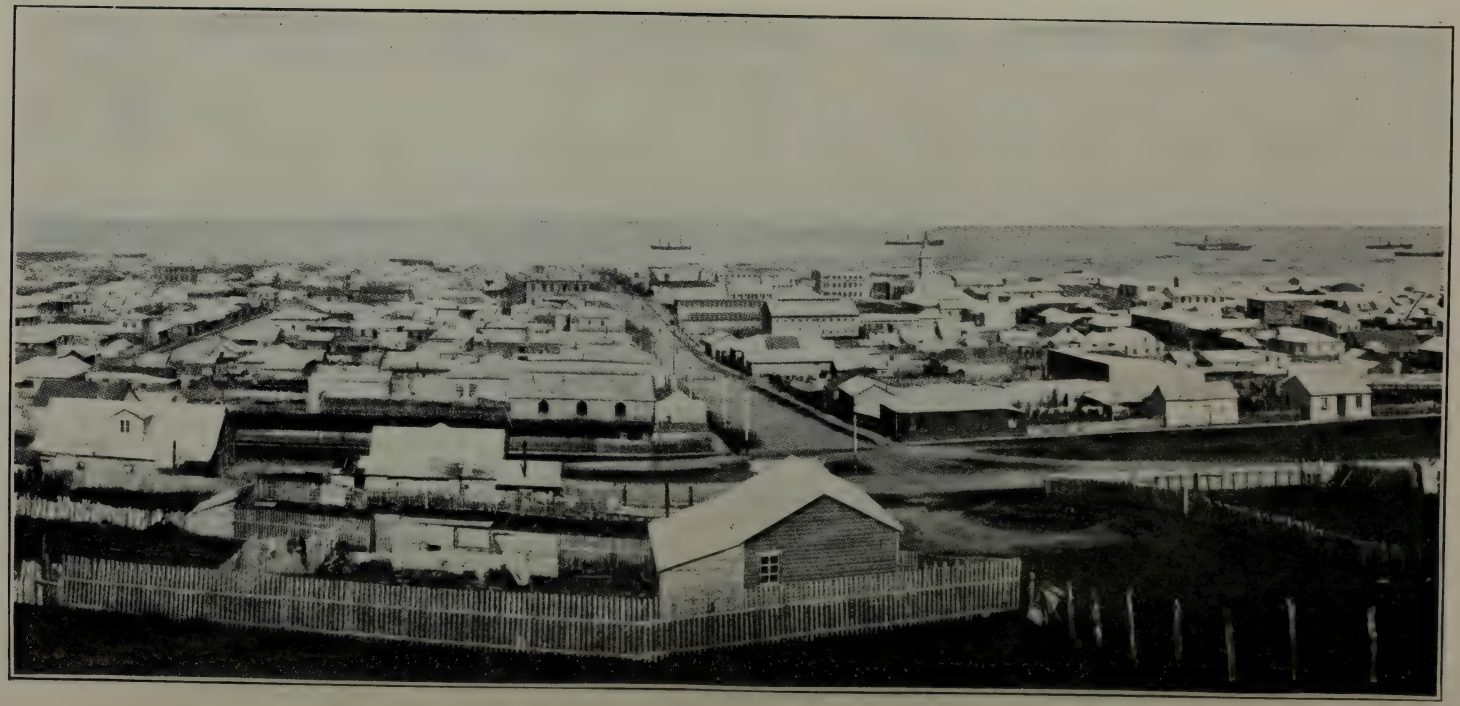
SITUATION. The territory of Magellan, or Magallanes, comprises the extensive region at the southernmost extremity of the South American continent, from Lat. 47° down to Cape Horn, and is intercepted by the Strait of Magellan, which divides it into two parts. It is bounded on the North by the Provinces of Llanquihue and Chiloé, by the Argentine Republic on the East and by the Pacific Ocean on the South and West.

AREA AND POPULATION. The area of this territory is 165,866 kilometers (64,000 square miles), it being the largest in extent of any of the Chilean territorial divisions, with a population of only 17,143. It is divided into two sections, that of the Continent, or the section lying north of Magellan Straits, and that of the Archipelago of Tierra

U. S. S. "ALBATROSS," IN THE STRAIT OF MAGELLAN.

del Fuego, lying south of the Straits, and composed of islands, the larger part of which belongs to Chile.

The capital of the Territory is Punta Arenas, which is the southernmost city of Chile and which has considerable commerce. Punta Arenas has a population of 8,500 and is the only city in the Territory of Magallanes. It is situated on the western shore of the Straits of Magellan, about half way between the Atlantic and the Pacific Ocean, and is 1,425 miles distant by sea from Valparaiso. It is the distributing point for southern Chile and a large part of the Patagonian section of the Argentine Republic. It is important as a coaling station for the ships passing through the Straits. The town has three hotels, two

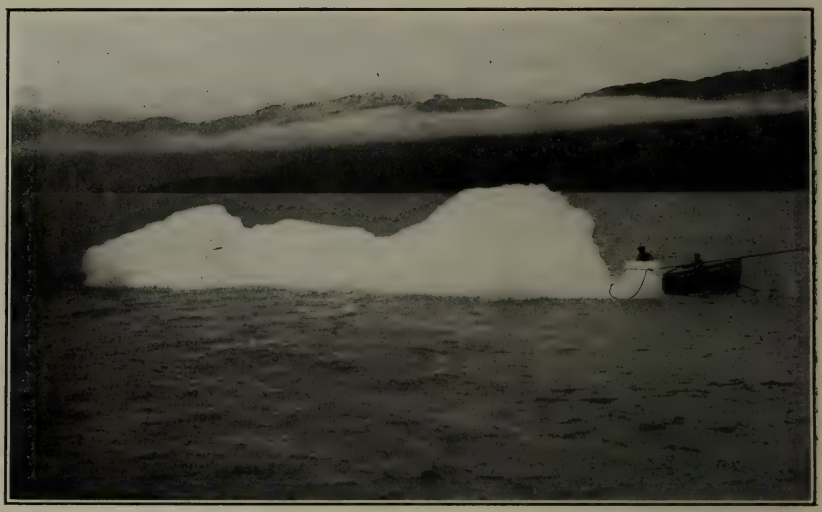


VIEW OF PUNTA ARENAS.

Punta Arenas is the only port of note in the Strait of Magellan, and is nearer to the South Pole than any other city of the world. It has the advantage of being a Free Port, where merchandise can be imported and exported free of duty.

theaters, several clubs, a hospital, several schools and four newspapers. There are also a foundry, brickyard, packing house, a brewery and dockyards. A railway 5 miles in length connects Punta Arenas with the coal mines at Loreta. A regular steamship service is maintained with both the Chilean and the Argentine ports. Punta Arenas is the center of the sheep and cattle raising country of southern Patagonia, Tierra del Fuego and the Falkland Islands, a considerable quantity of wool being shipped. It is the only free port in the Republic of Chile, all merchandise being allowed to enter and leave the port free of duty.

TOPOGRAPHY. Magallanes presents a variety of topographical features, being composed of the mainland, with numerous bays and intersections, and a number of islands, separated from each other by



ICEBERG IN MAGELLAN STRAIT.

The route traversed by the Transatlantic liners includes the Strait of Magellan proper, Smyth Channel, Victoria, Sarmiento, Los Inocentes, Concepcion channels, Canal Ancho and Messier channel, covering in all 365 miles in length, the width varying from two to twenty-five miles, and being one of the most picturesque maritime routes in the world.

various channels of different widths and depth. The continental portion of the territory is formed chiefly by a succession of high table lands, broken up by valleys extending on both sides of the Cordillera and surrounded by creeks, rivulets and marshes, which empty into the several channels.

The Cordillera de los Andes continues through the entire length of this Territory, extending as far as Cape Horn. The mountains in this Territory attain a height of from 1,500 to 2,200 meters (3,600 to 7,215 feet). The Sarmiento, 2,200 meters (7,215 feet), and the

Darwin, 2,134 meters (7,000 feet) above sea level, are the highest of these.

There are no streams of importance, but a number of creeks, such as San José, San Juan, Pinto and Perez. The largest lakes are the San Rafael, Blanca, Patos, Palomares and Cabo Negro.

ISLANDS. Among the numerous islands belonging to Magallanes the most important are: The island of San Javier, 11 miles long and 4 miles in width; the group of islands called Guayanecos (of which Leon and Wayer are the largest); Wellington Island, the largest on the Chilean coast, being 138 miles long and 35 miles wide; the Archipelagos of Madre de Dios, Hanóver and Adelaide and the Island of Tierra del Fuego.

Among the numerous channels the most important are the Messier channel, which separates the Island of Wellington from the mainland, and Sarmiento channel, communicating with Smyths channel, which, in turn, leads to the Straits of Magellan, and is navigable.

A number of peninsulas are situated along the coast of the territory of Magellan, the largest of which are the Peninsula of Taitao, the King William or Muñoz-Gamero and the Brunswick Peninsula. The small Peninsula of Tres Montes lies south of the Peninsula of Taitao, connected with the same by a small strip of land, and the Peninsula of Torellus, which is likewise connected with Taitao, lies northwest of the same.

INDUSTRIES AND RESOURCES. Owing to the southern latitude, agriculture is practised but to a very small extent, cattle and sheep raising being the principal sources of wealth, a considerable quantity of wool being exported. The exploitation of the forests, which furnish abundant timber of various kinds, and the trade in skins, furs and ostrich feathers, are other sources of income. The gold bearing sands and a coal mine are being worked and exploited.

COMMUNICATIONS. There are no railways in the territory, except the small road from Punta Arenas to the Loreta coal mines, five miles distant.

A number of roads and pathways connect Punta Arenas with some of the smaller villages, the largest of which is 170 kilometers (105 miles) in length.

Magallanes is entirely dependent on the steamship service for its communication with the rest of the Republic and the outside world. There are, however, a number of steamship lines which make Punta Arenas a regular port of call and connect it with all points both on the Pacific and Atlantic Ocean, as well as with Europe and the United States. The following lines touch regularly at Punta Arenas:

New York and Pacific Steamship Co., from New York to Callao, every two or three weeks.

The West Coast Line, from New York to Ecuador, once every month.

Kosmos Line, from Hamburg to San Francisco, every 2 or 3 weeks.

Pacific Steam Navigation Co., from Liverpool to Panama, every 2 or 3 weeks.

TIERRA DEL FUEGO. The islands forming the Archipelago of Tierra del Fuega (Land of Fire) are the southernmost of the Continent of America, and were discovered by Hernando de Magallanes, a Portuguese navigator, in the year 1520. It is said that when the discoverer of the Magellan Straits sighted land to the south, he saw numerous fires along the coast built by the Indians, and called it "Tierra del Fuego," which name it has retained ever since. The Archipelago is composed of a number of islands, the largest of which is the Island proper of Tierra del Fuego, with an area

ENTRANCE TO THE STRAIT OF MAGELLAN.

The entrance to the Strait of Magellan on the Pacific side is marked by two massive rocks, called Cape Pilar, while on the Atlantic side are Cape Virgin and Cape Holy Ghost.

of 48,000 square kilometers (18,530 square miles), of which 28,000 square kilometers (10,800 square miles) are Chilean and the balance Argentine territory. In this island the last mountains of the Cordillera de los Andes are situated, the Sarmiento Mountain being located here. There are also a number of rivers and lakes, the Lake Deseado being the largest, 16 miles in length and 8 miles wide. There are some extensive forests on this island, with excellent timber, but otherwise there is little vegetation of any kind. The quadrupeds are few in number, among them the guanaco and the perro fueguino (a mixture of dog and

ARAUCANIAN WOMAN AND CHILD.

The Araucanians, the aborigines of the Republic of Chile, were a savage, nomadic tribe of Indians, who for over four hundred years waged a fierce war against all invaders. They are now, however, fully pacified, and the few hundred survivors live peacefully on land assigned them by the Government.

fox). On the other hand, there are numerous birds of various kinds, such as the flamenco, mirlo, the peculiar and rare specimen of the swan with a black ring around its neck, wild goose, duck, etc. Magnetic iron is found in large quantities, and some gold has been found in the sand of the Lenox Island, situated south of the Beagle channel, as also coal, which, however, is said to be of inferior quality, and is not being mined.

The Tierra del Fuego Islands are inhabited by the Indian tribe, commonly called "Fueginos," which are, however, composed of three different races, the onas, the yaaganes and the alacalufes. They are nomadic tribes, and change their abode from time to time to what promises to be the best hunting ground, as they live exclusively on the products of the chase and fishing. It is estimated that there are some 3,000 of these Indians living in the Archipelago.

The other islands of some importance are: Desolación Island, Santa Ines, Clarence, and Dawson Island.

A few commercial concerns have established distributing centers at various points on the islands, among which Puerto Porvenir is the most important. Puerto Porvenir is situated on the main island of Tierra del Fuego, 18 miles distant from Punta Arenas, with which it has steamship connection, there being a regular line of steamers plying between Punta Arenas and Puerto Porvenir, with weekly sailings. Another important center is Puerto Harris, on Dawson Island, in which missionaries of the Salesian order have established extensive work shops, cattle ranches, schools for the Indians, etc. In 1890 the Chilean Government ceded this island to the Salesian Fathers for a term of 20 years, on condition that they establish a church, schools, hospitals and other establishments that might tend to civilize and educate the Indians.

On the island of Hoste English missionaries have founded a colony, called Tekenika, for the purpose of civilizing and educating the Indians. Hoste Island is situated south of the Beagle channel and west of the island of Navarino.

Lake Faguano, which extends into the territory of Argentina, is also of importance.

The temperature in Tierra del Fuego is said to be 7°2 C. in summer, and 3°6 C. in winter, which corresponds to 45° and 37° Fahrenheit, respectively. It snows heavily during the winter season, from March to September, and the heavy snow storms and strong gales blowing in that Territory make navigation in the Straits and the various channels difficult and dangerous during those months.

Cape Horn, the southernmost point of the continent, is situated in lat. 55° 58′ 40″ S. and long. 67° 16′ W., at the southern extremity of the island of the same name, and was first doubled by the navigator Schouten, a native of Hoorn, Holland, in the year 1616. It is practically the last spur of the Andes Mountains, or rather a detached link

of the same, having an antarctic climate and being noted for the fierce tempests raging in its neighborhood, which make navigation around it very dangerous and at times almost impossible.

PENGUINS ON SANTA MARTA ISLAND.

Santa Marta, a small island in the Strait of Magellan, a short distance from Punta Arenas, is one of the islands on which is found the penguin, a bird peculiar to the southern extremity of the American continent and in the Antarctic regions. Antarctic explorers have frequently subsisted on the flesh of these birds for months, when their supply of food had been exhausted.

CHAPTER V.

AGRICULTURE. REVIEW OF THE AGRICULTURAL WEALTH OF THE COUNTRY. PRINCIPAL PRODUCTS AND THEIR CULTIVATION. GOVERNMENT LANDS. FOREST PRODUCTS. STOCK RAISING. LAND LAWS.

Mining may be said to have been the prime factor in the development of agriculture in Chile, as the growth of the one necessarily demanded the expansion of the other in order to satisfy the simple needs of those engaged in the search for metals and other minerals. From colonial times, under the rule of Spain, agriculture developed as the working of the mines progressed. It is due to the decided protection given for some years past by the Chilean Government to the "mother industry," as well as to the introduction of modern machinery and methods, that agriculture has developed to such an extent, so as to become the second important industry of Chile.

Mr. B. Davila-Lorrain ("Chile-No. 7" Publication Officielle—Zurich) states that few countries have such a variety of agricultural products. With the exception of such products as are exclusively tropical, the same authority adds, the country may and does produce coffee, cacao, cotton, sugar cane, and other equally valuable articles of consumption. Chilean agriculture has characteristics of its own, different from what is common or peculiar to other countries. The general aspect of the lands under cultivation is not the same as in other parts of the world, as there are no small lots or patches of ground where agricultural products of various kinds are cultivated, nor a succession of woods and valleys with isolated patches of green, nor even farms to mark the site of an estate. In the agricultural region of Chile, as in the western portion of the United States, there are rolling plains, covered with wheat and corn, stretching as far as the eye can reach, while in other sections there are immense pasture lands devoted to the raising of cattle. These lands, whether devoted to grazing, or to agriculture, are all crossed by a network of irrigating canals.

The system of cultivation, on a large scale, by the landowner himself, says the same authority, the raising of cattle in the open country, and artificial irrigation, are the basis of Chilean agriculture. The great extension of the estates or country properties necessarily requires the employment of vast capital, a large stock of cattle of all kinds, machinery, buildings and farm hands. The method of cattle-breeding within walled enclosures, on the one hand, and the character of the

THE ADMINISTRATOR OF A LARGE CHILEAN ESTATE.

The country estates of many of Chile's wealthy families cover extensive territory, and, consequently, require the services of a large force of overseers, who are subordinate to a general overseer, known as the "Administrador." He is responsible only to the proprietor, and is expected to keep the property up to the highest efficiency, assign duties to the laborers, take cognizance of complaints, changes, or other matters pertaining to the routine of a large establishment.

water used for irrigation on the other, containing a large percentage of lime, have so far rendered the use of fertilizers unnecessary, while the number of farm hands or field laborers employed has been comparatively small in proportion to the area under cultivation.

AGRICULTURAL BELTS.—From an agricultural point of view, the country may be divided into three belts or zones, which, by reason of their peculiar climatic conditions, are suitable for the cultivation of certain products. Thus, the first belt extends from the northern limit of the Republic to the Province of Coquimbo. Rain is scarce in this section, so that spontaneous vegetation is restricted and cultivation is made possible only by means of irrigation. The second belt extends from the Province of Aconcagua to that of Concepción, and is better suited for the cultivation of the land than the former zone. Towards the northern portion of this belt rain is more abundant and frequent than in the first belt, while towards the south rainfall is abundant, and the streams increase in number. Spontaneous vegetation is luxuriant in the second belt, both in the valleys and in the coast range, and in the mountainous region of the Andes. The third belt extends from the Province of Bio-Bio down to Tierra del Fuego. Towards the northern section of this belt cereals and forage plants thrive in a wonderful manner, while towards the southern portion the cultivation of the soil becomes more difficult because of the frequent rains, and the constant humidity of the ground. This belt contains immense, thickly-wooded areas, partially unexploited. Each of these belts may be further divided into other zones stretching from west to east, having peculiar characteristics, and consequently varying agricultural value. Such zones are formed by the coast range, the central valley, and the Andean Cordillera, the latter being the source of many of the streams irrigating the territory of the Republic.

The process of discarding old methods for the cultivation of the soil, and introducing modern ideas and implements, has progressed considerably during the last few years. In view of the fact that conservative ideas are hard to conquer, even in the face of modern progress, Chilean agriculturists are progressive and readily adopt advanced ideas and scientific methods of land culture. The Chilean Government, effectively aided by the Sociedad Nacional de Agricultura (National Society of Agriculture) endeavors to diffuse information regarding the latest and most modern methods of cultivation, machinery, etc. The Government, as well as the said Society, maintain a number of agricultural schools and practical experiment stations in various parts of the country, and the said Society also holds expositions from time to time, to which the Government contributes liberally.

AGRICULTURAL PRODUCTS.—The principal agricultural products of Chile are such cereals as wheat, barley, corn, rye, oats and millet; farinaceous and leguminous plants, such as beans of several classes, peas, turnips, carrots, cabbage, lettuce, tomatoes, etc.; forage plants, such as alfalfa, and several species of clover, besides the natural pasture

grass, which grows without cultivation; as well as the grape, which is of considerable importance, the sugar beet, tobacco, sorghum, hemp, and other so-called industrial plants.

Among the fruits grown in Chile are the following: Cherries, plums, peaches, apricots, apples, pears, quinces, oranges, lemons, chestnuts, walnuts, cocoanuts, and several kinds of berries, while the products of other industries closely allied to agriculture are principally butter, cheese, hides and skins, dried and salted meats, honey, wax, tallow, wool.

According to the latest available statistics (Sinópsis Estadística i Jeográfica de la República de Chile en 1905), the area under cultivation and the yield of the crop 1905-6 was as follows:

Product.	Area under cultivation. Hectareas.	Amount of seed used. Tons.	Yield of crop. Tons.	Percentage of Yield.	Value of crop. Pesos.
Wheat	365,000	42,776	330,861	7.7	$33,885,220
Barley	73,338	9,404	80,928	8.6	7,870,577
Corn	21,112	531	21,490	40.4	1,780,657
Beans	21,964	2,271	24,336	10.7	4,234,971
Peas	13,016	1,600	13,280	8.2	1,018,015
Lentils	972	73	1,095	14.9	236,080
Potatoes	27,278	8,310	84,600	10.1	6,872,115
Alfalfa	37,958		47,207		1,420,550

As already stated, the cultivation of the land is generally done on a large scale by the landowners themselves, and in some instances by others having a share in the profits. The fields, according to the authority already quoted (Chile, No. 7—Publication Officielle—Zurich) are plowed with American plows, drawn by either horses or oxen. The harvest is made with mowing or harvesting machines in many cases, but generally with the scythe. Threshing is done by machinery, propelled either by steam, water, or horse-power, and yielding as much as 100 hectoliters per day. Sowing is generally done from April to July, and the crop harvested between January and March. Rotation of crops is largely practised by Chilean farmers, they planting cereals for two or three years, then alfalfa, thus turning it into pasture lands, then again cereals. This process, together with the open air system of fattening cattle, which fertilizes the soil, and irrigation, which always carries along a sediment beneficial to the ground, is enough to render the soil as fertile as ever. An idea of the fertility of the land can be gathered from the fact that in some sections the grass is permitted to grow, the cattle turned into the field to graze, and the grass which is left by the cattle is not even cut, but allowed to rot, it being not worth while to cure it for hay.

Contrary to the method employed in the cultivation of cereals, the planting, etc., of vegetables is done almost exclusively by the small farmer. As a rule, these farmers devote the land adjacent to their houses to the cultivation of vegetables. The principal vegetables cultivated are: Potatoes, onions, peas, beans, peppers, as well as lettuce and asparagus, which latter is cultivated very extensively.

VITICULTURE. The cultivation of the grape, and the manufacture of wine, is undoubtedly one of the most important branches of agriculture in Chile, both the lower and the higher grades of wines and brandies being made, considerable quantities being exported to Bolivia and Perú, although the home consumption is always increasing.

The Government is also assisting this industry in various ways, having established various schools for the study of viti- and vini-culture, and introducing new methods and machinery.

There is now an area of 60,000 hectares under cultivation in Chile, yielding over 2,000,000 hectoliters of wines.

Few countries are more adapted than Chile to the cultivation of the vine, says Davila-Larrain, in his work above quoted, as winter is sufficiently cold to give vegetation a needed rest, spring sufficiently early and mild to help along the budding and effervescence of the plant, and summer is sufficiently long and warm to properly ripen the fruit. Viticulture, in Chile, dates back about 30 years, although the vine was introduced by the Spaniards as early as the XVI century, according to some authorities. The industry has, however, made great strides during the last few years, and has a most promising future. The character of the vines varies greatly, according to location, climate and soil. The grape of the southern belt of Chile is generally small, and grows on the hill-sides, while the grape of the central belt is larger in size, and thrives equally well in the plains and on the hills. It is claimed that the grape in Chile yields more wine than in Europe, having all the general characteristics of the Medoc or Burgundy product. Some vineyards, it is claimed, have averaged 180 pounds sterling per acre for a single year. It requires from four to five years to obtain any profits from grape culture, and the wine grower must have sufficient means to work his property and build suitable cellars. Under these circumstances, many viticulturists make arrangements with the owners of the land for the cultivation of the grape either by planting new vineyards, or by improving those already planted.

Chile is peculiarly adapted to grape culture, by reason of its geographical position, its topography, and the fertility of its soil. Grape culture requires a dry, cool soil, somewhat inclined and exposed, the ground being such as to easily absorb moisture. There are two kinds of lands in Chile, that called *rulo*, or dry lands, scarcely watered by rainfall, and the *regadio*, or lands irrigated by means of canals, sometimes built at great expense to utilize the waters of the rivers, or mountain streams. As the grape is a product of the temperate zone, it thrives in Chile from Coquimbo on the north to Angol on the south, the grape region being within 39° latitude, and at a maximum altitude of 700 meters above the sea level.

The grape commences to yield in the dry or *rulo* lands from six to eight years after planting, attaining its maximum production at the twelfth year, while in the irrigated, or *regadio* lands, production begins from the third to the fourth year, reaching its maximum from

the sixth to the eighth year. It is known that 50 years is about the regular life of a vineyard in Chile, the yearly vegetation lasting from August to May. In the northern regions the first flowers or buds begin to appear in November, while in the central and southern belts they do not appear until December. The grape matures, according to regions, between March and May, the month of April being considered the height of the season.

Chile, as regards climatic conditions, soil and adaptability for grape cultivation, may be divided into three belts or regions, viz.: the northern, central and southern regions; the northern region, embracing Atacama and Coquimbo, as far as the Choapa River, consisting of irrigated lands. In this belt the grape is cultivated in the valleys and small plains. Lack of abundant water prevents cultivation on a large scale. Native and French stock is under cultivation in this region. The central region extends from the Choapa to the Maule River. The ground, which has a slight incline, is rarely plowed, but frequently irrigated. The French and native stocks are also cultivated here. The third, or southern, region extends from Maule to Bio-Bio, and embraces the two kinds of soil above mentioned. The Parral and Linares sections consist of irrigated lands, while in the section extending from Cauquenes, Itata, and Concepción, to Angol, the vines are planted in hillocks consisting of a sandy and clayey soil. Native vines predominate in this region. The first industrial census of Chile was taken in 1831, and two years later Mr. Manuel Rengifo, then Minister of Finance, estimated the number of vines existing at that time in the provinces of Coquimbo, Aconcagua, Santiago, Colchagua, Talca, Maule and Concepción at 19,664,905. In 1836 the number of vines was 25,000,000 and in 1865 50,000,000. At the end of 1902 the total extent of the lands devoted to the cultivation of the grape was unofficially estimated at 60,000 hectares, and the number of vines at 50,000,000, while the capital invested was variously estimated at from 300 to 400 million pesos, divided between 20,000 viticulturists, the total yield being about 2,000,000 hectoliters per annum. It is estimated that the area suitable for the cultivation of the grape is 1,000,000 hectares.

The varieties most common in Chile are the following: Golden Chasselas, Gamet, Pinots (two varieties), Muscat, Sauvignon and Semillon, all French stock; Palomino and Muscat of Alexandria from Spain; and Riesling from Germany, among the white varieties. Among the dark or black grapes, France is represented by the following stock: Aramont, Carbenet, Carbenet-Sauvignon, Gamet d'Orleans, and Petit or black Gamet, Grappe, Cote Rouge or Malbeck, Mansenc, Merlot, Black Muscat, Petit Bourchet, Black and Grey Pinot, and Romano or Cesar grapes.

The native varieties embrace, besides those first introduced in the country by the Spaniards, two or three French classes. The stock introduced by the Spaniards were the common grape, San Francisco,

white transparent, two varieties of moscates from Italy, one white and another black, and the common pink variety. The Government has, however, nearly all known European and Oriental varieties of grapes.

Among the imported varieties, the following are under cultivation: White grapes—Claret, Chasselos, Cunichon, Mestier, and Moscadelle de Bordeaux from France; Corinth from Greece; Malvasia Litges from Spain, and Verdelho from Portugal. Pink Grapes—Chasselas, and Greek from France; and Moscatel from Portugal. Dark Grapes—Meunier, Olivette, Sirah, Piegpoul, Tressot (two varieties) from France, and Garnacha, Macabeo and Mourvedre from Spain. Amer-

WINE VAULTS AT COUSIÑO'S, SANTIAGO.

The Cousiño family own one of the largest vineyards in Chile at Macul, near Santiago, at which some of the best known varieties of vines are raised, from which an excellent quality of wine is made.

ican varieties—Clinton, Hernemont, Jacquez, Riparia Tomentosa, Vialla, Vitis Salonis, and York-Madeira.

Among the most important vineyards in the country those of Panquehue and Macul are treated at length in the report above mentioned, the following data being extracted from said work:

The Panquehue vineyard, in the department of San Felipe, Aconcagua, is the largest in Chile. It lies at an altitude of 520 meters (1,706

feet) above the sea level, and measures 393 hectares in extent. The land is well irrigated.

Varieties of grape.	Number of vines.	Production Hectoliters.	Yield per plant liters.	Degree of sugar.
Carbenet	1,600,000	14,500	0.91	11° to 20°5
White Semillon		2,000		12°5
Malbeck				12° to 12°5
Roman				12° to 12°5
Black Pinot	400,000	1,500	0.87	12° to 12°5
Black Gamet				12° to 12°5
White Loca Grape				.10
Total	2,000,000	18,000	0.90	

The report from which this data is taken is authority for the statement that the variation of the degree of sugar in the Carbenet stock is due to the age of the wine, old vines yielding from 11° to 11° 5 sugar while the new plants yield from 12° to 12°5.

The Macul vineyard is situated at about 18 kilometers (11 miles) from Santiago at an altitude of 680 meters (2,230 feet) above the sea level, and covers an area of 70 hectares. The vineyard is well irrigated, and stands on the slope of a hill. The following table shows the degree of development the vineyard has attained:

Varieties of grape.	Number of vines.	Production Hectoliters.	Yield per plant liters.	Degree of sugar.
Carbenet	139,200	1,410	1.01	12°
Verdot	46,100	626	1.35	12° to 14°
Mixed varieties	36,000	300	0.83	
White Semillon	33,200	246	0.74	
Malbeck	20,800	183	0.87	
Pinot	16,300	542	3.32	11°5 to 12°
Merlot	13,300	118	0.88	
Native grape	13,100	100	0.76	
Chasselas	2,700	30	1.11	

The vineyards of the "Quinta Normal de Agricultura," or Standard Farm, an institution supported by and under control of the Government, are situated at an altitude of about 530 meters (1,738 feet) above the level of the sea. The following is the general condition of the farm, as regards the cultivation of the grape and its product:

Varieties of grape.	Number of vines.	Production Hectoliters.	Yield per plant liters.	Degree of sugar.
Carbenet	5,500	170	3.09	11° 75
Black Pinot	3,200	20	0.62	11° 50
Malbeck	2,500	34	1.36	11° 75
Grappu	2,500	28	1.12	
Mansene	2,000	14	0.66	
White Loca	1,800	35	1.94	8° 50
White Semillon	3,000			
White Pinot	1,600	32	0.58	13° 00
White Sauvignon	500			
Riesling	400			
Miscellaneous	600	17	2.80	
Total	23,600	350	1.48	

Under "Miscellaneous" the following varieties are included: Red Muscatel from Madeira, Italian Malvasia, Early Black and Alexandria Muscatel, Golden Chasselas, Jerusalem Chasselas, Aranoa, White and Black Gamet, Verdot, Piñot, and a few others.

The annual product of the vineyard* is estimated at about 120 hectoliters per hectare. Among the wines made at the institution there is a white wine which is considered one of the best products of Chile, and is sold in bottles only, at the rate of about $12.00 per case. There as also a red Carbenet, from one to two years old, sold in casks at $7.00 per arroba.† An ordinary table wine, one year old, is also sold in casks at $4 or $5 per arroba. Native grape wines, and a good quality of Port and Malaga, from 8 to 10 years old, are sold at $18 per case. White wines, from black grapes, have been sold at prices ranging from $6 to $8 per arroba. The "Loca" white grape produces an excellent grade of cognac or brandy, which after 8 years maturing has been sold at $50 per case.

The Cauquenes School of Viticulture, which is also a state institution, is especially devoted, as its name implies, to the study, both theoretically and practically, of viticulture. The school experimental grounds cover over 20 hectares, at an average altitude of 150 meters (492 feet) above the sea, there being about 14 hectares of this property occupied by hillocks. The land belongs to the *rulo* or dry land class.

The following results have been obtained at the Government school at Cauquenes:

Varieties of grape.	Number of vines.	Production Hectoliters.	Yield per plant liter.	Degrees of sugar.
Native Grape—Hillocks	47,388	112	0.23	13° 50
Native Grape—Valley	17,465	128	0.72	11°
Carbenet	5,438	16	0.20	13°
Total	70,291	320	0.45	

The French grape yields but little. Even under the best conditions the yield per plant will scarcely reach one-third of one liter. The native variety, when planted in low ground, does not yield as much when cultivated in the hillocks, where its production is estimated at three-fourths of a liter.

There is also a vineyard at the Agricultural School of Chillán, Province of Ñuble. This is a state institution, measuring about 6 hectares, at an average height of 100 meters (328 feet) above the sea. The following table shows the condition of the vineyard and its production:

Varieties of grape.	Number of vines.	Production Hectoliters.	Yield per plant liter.	Degrees of sugar.
Carbenet	14,280			11°
Malbeck	4,760			11°
White Pinot	4,760	390	1.36	10°
White Semillon	4,760			10° 50
Total	28,560	390	1.36	

*Short sketch of the "Quinta Normal de Agricultura," Santiago, Chile. By F. LeFeuvre, Santiago de Chile, Imprenta Moderna, 1901.

†An Arroba is equivalent to 35 liters.

VINEYARDS OF THE COUCHA FAMILY.

One of the largest and best kept vineyards of Chile is that of the Coucha family, situated near the city of Santiago, and on which thousands of hectoliters of an excellent grade of wine are annually produced.

The following is the average yield per plant of the Chilean vineyards:

White Loca	1.67 liters.	White Semillon	0.87 liters.
Carbenet	1.30 liters.	Native Grape	0.83 liters.
Muscatel	1.30 liters.	Black Pinot	0.78 liters.
Merlot	1.28 liters.	Black Gamet	0.72 liters.
Verdot	1.25 liters.	White Pinot	0.66 liters.
Malbeck	1.20 liters.	White Sauvignon	0.64 liters.
Romano	1.09 liters.	Reisling	0.58 liters.

The cost of planting and the care of a vineyard is from $110 and $500 per hectare, according to the quality of the land, whether dry or irrigated, and the system employed for the planting of the vine. These figures do not include the price of the land, which varies according to location.

The harvest of the grape is from March to April, according to the soil, climatic conditions, etc. Men, women, and children are employed to do the harvesting, the ripe grapes being selected and placed in large deposits, weighing, when full, about 50 kilograms (111 pounds). These deposits are taken in cars to the presses. It has been estimated that on an average a man or a woman will harvest in one day about two hectoliters of grapes in irrigated lands, and about 1.50 hectoliters in dry lands.

At the School of Viticulture of Cauquenes the quantity of must obtained from 100 kilograms of grapes was as follows:

Grapes.	Liters.	Grapes.	Liters.
White Loca	58.40	Black Muscatel	50.
White Semillon	56.	Molinero	49.30
Verdot	55.40	Native variety	47.50
Malbeck	54.50	Gamet	46.70
White Muscatel	52.	Pinot	46.70
Carbenet	51.90	Roman	41.10

Experiments made at the same institution with native grapes gave the following average yield of must per 100 kilograms (220 pounds) of grape:

Native grape from hillocks	52	liters.
Native grape from the valley	55	"
Carbenet, from the valley	55	"

The southern varieties contain more juice than the northern grape.

At the Pan-American Exposition, held in Buffalo in 1901, Chile was awarded 14 gold, 22 silver, 13 bronze medals, and 5 honorable mentions for its wines. The exhibit of Chile contained 29 samples of white wines, 44 red wines, including Claret Zinfandel, Burgundy, etc.; 31 samples of Sherry, Port, Madeira, Malaga, Muscatel, etc.; 11 Sparkling Wines of various kinds, and 31 samples of rum, brandy, and other grape liquors.

GOVERNMENT AID. In 1842 the State acquired 20 hectares of land situated near Santiago, and transferred them to the "Sociedad de Agricultura" (Agricultural Association), established in 1838 for the purpose of creating a practical school of agriculture. Eight years later the property was increased by the addition of 25 hectares. The

institution now established on this property is called the "Quinta Normal de Agricultura" (Standard Farm), its several apartments or sections, such as the museums, zoological gardens, laboratories, hothouses, aquarium, the experimental vineyards, the Agricultural Institute and the Practical School of Agriculture, etc., occupying an area of about 135 hectares. The "Quinta Normal" is an institution devoted to the study of the scientific and technical methods of agriculture, as well as to practical investigations and experiments on the grounds of the farm. The institution is now under the direct control of the Department of Industry and Public Works, represented by two directors, one in charge of the vegetable or botanical features of the Quinta, and the other in charge of the Zootechnical industries connected therewith. The several sections and school of the farm are connected by a narrow gauge railway, 6 kilometers (3½ miles) in length, aside from the several avenues, etc.

The park grounds in the "Quinta Normal" cover an extension of 59 hectares, of which 21 hectares are devoted to vineyards; 22 hectares to pasture grounds; 4 hectares to forage plants; 7 hectares to trees and shrubs; 1 hectare to flowers; 2 hectares to orchards, and 2 hectares to the zoological garden. The rest of the land is occupied by the hothouses, the astronomical observatory, school buildings, etc.

Other agricultural institutions supported by the state are the "Instituto Agricola," or Agricultural Institute, founded in 1876, and five schools of practical agriculture, of which there is one in Santiago, connected with the Quinta Normal, and one at each of the following cities: Chillan, Province of Ñuble; Concepción, Concepción; Ancud, Province of Chiloé; and Cauquenes, in the Province of Maule. The last named school is especially devoted to the cultivation of the grape and the wine industry.

SUGAR INDUSTRY. The following information regarding this industry, which promises to become one of the important in the country, is taken from an important Chilean publication:*

"The soil and climate of Chile indicate that the sugar industry would prosper in the Republic, if properly attended to, not only to the extent of supplying the domestic needs of the nation with that important staple, but also in such quantities as would leave a considerable surplus for export to foreign markets. The sugar beet is one of the tubers that develops most luxuriantly in the central zone of the Republic. In addition to the natural adaptability of the soil and climate of Chile for the growth of this root the country also possesses deposits of nitrate and guano which are recognized to be the best and most appropriate fertilizers in the cultivation of this highly saccharine-producing tuber. Unfortunately the cultivation of the sugar beet has not been sufficiently extended, and at the present time only two of the factories in the country are capable of extracting and refining sugar from the sugar beet. One of these, situated at Guindos, has not been in operation since 1890. The other plant is at Parral, and is owned by a corporation having a capital of $1,500,000. Until January, 1904, this factory only produced brown sugar, which was delivered to the refinery at Penco, but since the date mentioned new and improved machinery

*Boletin de la Sociedad de Fomento Fabril, Núm 12, Diciembre, 1904.

has been introduced, and the refining is now done in the establishment itself. The production of beet sugar in this factory during the four years, 1900-1903, was as follows:

Class of Sugar.	1900. Kilos.	1901. Kilos.	1902. Kilos.	1903. Kilos.
First	390,604[2]	89,688	166,897[4]	168,671
Second	75,378	9,419	42,738	35,126
Third,	26,274	....	6,525	7,936
Fourth	6,525	....	.....	.....
Total	498,781[2]	99,167	216,160[4]	211,733

In 1903 the factory at Parral (Membrillo) did not produce raw sugar, as it was without the raw material with which to work.

The other refineries in the Republic are situated at Viña del Mar and at Penco. Both belong to corporations. They use raw sugar imported from Peru, with the exception of a small quantity which is supplied to them by the factory at Parral (Membrillo). Raw sugar pays an import duty of $6.50 per 100 kilograms (220 pounds). The imports of raw sugar in 1902 aggregated 41,397,378 kilograms, valued, approximately, at $4,139,738. The quantity of white or granulated sugar imported during the same period amounted to 162,395 kilograms, of an estimated value of $24,258. Sugar of the latter class is sold in the country in the form in which it is imported, and is subject to a duty of $11.40 per 100 kilograms (220 pounds). The imports of refined sugar during the same period amounted to 1,646,930, valued at $329,389. Refined sugar pays a duty of $14.35 per 100 kilograms (220 pounds). The total imports of sugar in 1902 consisted of 43,206,723 kilograms (95,253,540 pounds), valued, approximately, at $4,493,485.

The sugar refinery at Viña del Mar has a capital of 4,667,666 pesos gold, of a value of 18 pence. The production of this refinery for ten years is given below:

	Pounds.	Kilograms.		Pounds.	Kilograms.
1894	26,095,000	11,861,203	1899	38,000,000	18,968,186
1895	28,984,000	13,174,530	1900	45,056,000	20,479,093
1896	26,546,420	13,273,210	1901	46,420,000	21,096,295
1897	31,444,307	14,292,867	1902	53,768,000	24,439,964
1898	36,235,000	16,470,310	1903	53,427,000	24,285,419

The average dividends paid to the shareholders during the ten years mentioned were 10⅓ per cent annually on the capital invested.

The refinery at Penco is not as old as the Viña del Mar refinery. It has a capital of $3,000,000 gold, of a value of 18 pence. The production of this refinery for ten years has been as follows:

	Pounds.	Kilograms.		Pounds.	Kilograms.
1894	9,777,000	4,444,428	1899	22,270,000	10,123,763
1895	13,885,350	6,311,522	1900	44,100,000	19,921,722
1896	16,161,000	7,345,970	1901	23,294,000	10,588,419
1897	19,730,000	8,957,902	1902	24,915,000	11,324,001
1898	22,253,000	10,115,360	1903	28,600,000	12,982,632

In 1902 and 1903 this company paid an average annual dividend to its stockholders of 9½ per cent on the capital invested.

A recapitulation of the production of the refineries together with the imports in 1902 shows that the total consumption of sugar in the Republic in 1902 aggregated 37,573,310 kilograms (82,834,120 pounds), or an equivalent of 11,838 grams per inhabitant, estimating the population of Chile at 3,178,783 persons, the number given in the "Statistical Synopsis" for 1903. The average price of sugar in the republic in 1902 was 43 cents per kilogram (2.2046 pounds)."

The refineries at present established in the country are, however, only able to supply a small proportion of the total consumption of sugar, and a considerable amount of both refined and raw sugar is

therefore imported. In the year 1905 the imports of sugar in Chile were as follows:

	Kilograms.	Pounds.	Value Pesos Chilenos.
Refined sugar	4,994,185	10,990,000	$ 998,837
White sugar	938,520	2,065,000	140,778
Granulated sugar	49,208,460	108,257,600	4,920,846
Raw or impure sugar	882,925	1,942,600	70,634
	56,024,090	113,255,210	$6,131,095

of which quantity there was, however, 162,490 kilograms (357,480 pounds) of refined sugar exported to the Argentine Republic and Bolivia, valued at $64,996 (133,330 kilograms to Argentina and 29,160 kilograms to Bolivia).

The exports of the principal agricultural products for the year 1907-1908, as given by the Chilean Consul-General in New York, Señor Adolfo Ortúzar, in his book, entitled, "Chile of Today, 1907-1908," are as follows:

Wheat	7,975.5 tons.	Oats	7,849.06 tons.
Bran of wheat	17,922 tons.	Maize	525.36 tons.
Barley	45,194.50 tons.	Rye	739.25 tons.
Barley malt	1,756.96 tons.		

Great Britain takes the largest share of Chile's export of barley and oats, and also a large share of the wheat, while Perú and Bolivia are large purchasers of all the agricultural products exported by Chile.

Chile exports about 5,000 tons of lucern annually, mostly to Bolivia, Perú and Panama, which countries also purchase some 1,600 tons of nuts and about 400 tons of dried fruits and raisins.

Land Laws.

The first legislative measure regarding the use of vacant lands for the establishment of colonies or settlements was enacted by the Chilean Congress under date of November 18, 1845, and supplemented by the laws of January 9, 1851, and others. By said act the President of the Republic is authorized to make use of certain portions of vacant lands for colonization or settlement, either by native Chileans, or by foreigners going to the country with the intention of becoming residents of Chile, provided such foreign residents follow a trade or industry. The President is also authorized to allot to each colonist or settler a certain portion of land, the area of which varies according to the peculiar circumstances of each case, and to furnish tools, seeds and other effects and implements necessary for the cultivation of the land and the support of the colonists, for one year. The same law provides that transportation expenses are to be paid by the Government, and to be reimbursed by the colonist as per agreement. By act of January 9, 1851, the President is authorized to dispose of such vacant lands as may be necessary for colonization or settlement, in accordance with the provisions of the Act of 1845 above quoted.*

*Further information on the subject will be found in Chapter devoted to "Immigration and Colonization."

According to Chilean legislation (Civil Code, Art. 589-590) national lands are, in general terms, the lands belonging to the whole nation. These lands are subdivided into public lands, also called national public lands, and state or fiscal lands. Public lands embrace streets, parks, bridges, highways, etc., while state or fiscal lands are lands within the boundaries of the nation, which have no particular owner. State lands are also called *baldíos* or vacant lands.

Forest Products.

Owing to the peculiar topographical and geographical features of Chile the wooded area of the country is distributed very unevenly and shows a considerable variety of trees. The area covered by forests in Chile is estimated at about 200,000 square kilometers, equal to about 75,000 square miles, almost 26 per cent of the total area of the country.

Forests are to be found in nearly all of the Provinces of Chile, especially on the slopes of the mountains and in the valleys; in the Provinces of Valdivia, Bio-Bio, Llanquihue, Chiloé, and the Territory of Magallanes.

In these latter Provinces there is abundant timber for building purposes, and cabinet woods, as also a number of trees, which are valuable on account of their bark, such as the quillay (quillaja saponaria), the lingue (persa lingue) and the ulmo. The bark of the quillay is used extensively as a substitute for soap, especially for the cleansing of fine silks and linens, and also by dyers. In Europe it is generally known as Panama wood. The barks of the lingue and the ulmo are valuable because of the tannin they contain. In the year 1907 Chile exported 1,314,500 kilos (2,893,000 pounds) of quillay bark and 748,600 kilos (7,497,200 pounds) of lingue. Most of the quillay exported goes to Great Britain and Germany, while Perú is the largest purchaser of lingue.

A number of fruit trees are also indigenous in Chile, and nearly all the varieties of the temperate and sub-tropical zone and some of the varieties of the tropical zone are successfully cultivated. An excellent quality of apples is raised in the Provinces of Valdivia, Cautín and Llanquihue, while oranges, lemons, olives and chestnuts grow in the northern Provinces, and peaches, apricots, cherries, almonds and nuts of all kinds are to be found in the central and southern Provinces. Cocoanuts grow in the northern Provinces, and a considerable quantity of these as well as of other nuts is exported, especially to the neighboring Republics. In the year 1907 3,705,100 kilos (8,151,000 pounds) of nuts of all kinds were exported.

Other trees of special interest are the Chilean palm (Jubea spectabilis), from which a syrup is obtained, called "miel del pais," and the "balsamo-carpum," the seeds of which, the "algarobilla," contain a large percentage of tannin. Algarobilla is also obtained from a number of shrubs and is largely exported. In 1907 Chile exported

136,000 kilos (300,000 pounds) of this article, most of which was shipped to Germany.

The medicinal herbs, of which Chile possesses a considerable number and variety, may be mentioned in this connection. All of these medicinal herbs are indigenous and no attempt has as yet been made to cultivate any of them in the country. Among the many varieties that thrive in Chile the most important are: The Boldo (peumus boldus), the leaves of which are used successfully in the treatment of liver troubles and from which a syrup is made, which is used as a stimulant and tonic; the Canchalagua (Chironia Chilensis), used extensively as a substitute for quinine; the Paico, Piche, Pircum, Palqui, Matico, etc., etc. During the year 1907 182,550 kilograms (401,500 pounds) of medicinal herbs of all kinds were exported from Chile, most of which was shipped to Germany.

According to an authority on Chilean forests,* there are over one hundred different classes of forest trees in Chile, some of the principal ones being the white acacia (robina pseudoacacia), the poplar, carob tree (prosopis), the arancaria (a species of pine), the cypress, elm, oak, ash, hickory, walnut, cedar, several species of pines, etc., etc. The poplar is found all through the central valley of Chile on the great haciendas, and the eucalyptus has been successfully planted in the vineyard lands of the Provinces of Aconcagua and Valparaiso, as well as in other parts of the country.

From the Guaitecas Island, south of Chiloé, large quantities of cypress wood are shipped to the other Provinces, which is used in the vineyards, as also for telegraph poles, fences, etc., for which purposes it is particularly adapted, in view of the fact that it does not decay like other woods.

In addition to being able to supply her own requirements of lumber Chile ships a considerable quantity of lumber to Bolivia and Perú and other South American Republics, having exported 233,748 Chilean pesos worth of lumber during the year 1907.

Stock Raising.

In the Republic of Chile the raising of cattle, sheep, horses, goats and hogs is extensively practiced, most of the territory of the Republic being peculiarly suited for the development of stock-raising.

According to the last official census, taken in the year 1906, the live stock in the country was as follows:

Horses, asses and mules	746,150
Bovines	2,674,666
Sheep	4,528,109
Goats	476,739
Hogs	338,993
Various	3,876
Total	8,768,533

*"Los Bosques en el Pais," Federico Albert, Santiago de Chile, 1901.

Coquimbo possesses the largest number of goats, while the Provinces of Santiago, Arauco and Llanquihue have the largest number of cattle and the Territory of Magallanes has the largest number of sheep in the country, 1,875,000 out of a total of 4,528,000.

The total number of animals slaughtered during the year 1906 was as follows:

Bovines	370,281
Sheep	594,235
Hogs	164,981
Total	1,129,497

The exportation of wool, especially from Tierra del Fuego and the Southern Provinces, has been increasing steadily within the last few years, there having been exported 3,600,000 kilos (7,950,000 pounds) in the year 1907.

The Chilean breeds have improved greatly of late, due to the introduction of foreign races. This state of development is due to a great extent to the efforts of the Normal Farm already mentioned, which holds fairs and other shows, where the best specimens of stock in the country are exhibited. Among the varied animal productions of the country the Chilean horse, a descendant of the Arabian and Andalusian stock first imported by the Spaniards, is worthy of special mention. Native horses make excellent saddle horses, being sure-footed in the mountains and swift in the plains. They have degenerated somewhat in size, although preserving all the other characteristics of their sires. The native breed has been crossed with choice specimens of Arabian stock, English thoroughbreds, Cleveland, Percherons, and other races, the product being all that could be wished for. Chilean horses are preferred to any other breed for hard work, and especially for army use, while the crossed stock has given excellent race horses which favorably compare with some of the best foreign stock. Mules and asses are also produced in the country, for draft and pack-carrying purposes.

Next in importance is the bovine, or beef-cattle race, which also originates from the stock imported by the Spaniards during colonial times. The native stock is of medium size, strong for work in the field, but rather of an inferior quality for food or dairy purposes. In order to improve the stock several English, French and American choice breeds have been introduced with success, especially the Durchoice breeds have been introduced with success, especially the Durham.

An industry closely connected with cattle-breeding is that of cheese and butter making, and while the dairy industry in the country is not as prosperous as it might be, considering the advantages offered by the climate, the butter and cheese produced are both of excellent quality. These two products have been improving steadily since the introduc-

tion of modern and scientific methods. The number of dairies in the country is on the increase. The preparation of condensed milk, both for local consumption and for export, has been given considerable attention.

Sheep are generally the product of the crossing of foreign breeds, the stock being thus improved. For a time more importance was attached to the production of sheep for consumption than for wool, but now both branches of the industry are equally attended to, the result being fine meats and excellent wool.

Pigs, goats, and poultry of all kinds are also bred on a large scale, there being several improved species, the production being about equal to the demand for consumption.

The "Quinta Normal" has a section devoted to pisciculture, and it is expected that this will be the beginning of a prosperous industry, as the rivers and lakes of Chile are peculiarly suited to the propagation of all kinds of fish. There is in Valparaiso a Fishery School, where everything relating to the procreation of fishes, hatcheries, etc., is practically taught. Experiments made to establish salmon hatcheries in the rivers Imperial, Cautín, Valdivia and Bueno have been most successful. The lobster of the Juan Fernandez Islands has been successfully transplanted to Valparaiso, where it has grown and developed into a promising industry.

Apiculture.

This important branch of agriculture is developed to a considerable extent in Chile, there being no less than 76,500 apiaries established in the country. Of these there are 14,700 in the Province of Aconcagua and 11,600 in the Province of Coquimbo, the balance being distributed over the other Provinces.

According to the last official statistics available these apiaries produced 15,285 metric quintales of honey and 1,753 metric quintales of wax, valued at 576,672 pesos, Chilean money. A considerable quantity of both honey and wax is exported annually and obtains the best prices in foreign markets.

Bees were first imported into Chile some forty years ago by Mr. Patricio Larrain Gandarillas, who introduced a considerable number of them from Italy. The climate and vegetation of the Provinces of Coquimbo and Aconcagua seemed to be particularly suitable to the Italian bee and it soon acclimatized itself, and from that time on apiculture in Chile has progressed and developed, until it has reached its present state.

Apiculture in Chile is considered to be very profitable, as the bees are active and industrious, and it is estimated that each hive yields on an average 50 pounds of honey. The system of farming on shares has of late been adopted by some apiculturists and seems to give satisfactory results.

The export of purified wax during the year 1905 amounted to 400,000 kilos (884,000 pounds), and that of honey amounted to 2,200,000 kilos (4,800,000 pounds), Germany being the largest purchaser of both Chilean wax and honey, having received about 1,500,000 kilos (3,305,000 pounds) of the total quantity of honey, and some 300,000 kilos (662,000 pounds) of the total quantity of wax exported. Great Britain and France take about even shares of the balance.

UNIVERSITY OF SANTIAGO, SANTIAGO. WHERE THE FIRST PAN-AMERICAN SCIENTIFIC CONGRESS WAS HELD.

CHAPTER VI.

MINING AND METALLURGY. DISTRIBUTION OF MINERAL WEALTH. MINING LAWS.

The progress of the Republic of Chile is of necessity closely connected with the development and exploitation of the vast mineral wealth of the country. Commerce and industries, as well as the extension of means of communication and transportation, and to a certain extent, even the development of agriculture, are all more or less closely connected and dependent on the development of the mines.

Nitrate of soda, or saltpeter, is, of course, the most valuable and most important of Chile's mineral products, but copper, gold and silver are also found in considerable quantities, there being a number of large smelting works for the smelting of copper ores established in the northern Provinces. The extensive coal veins in the Provinces of Concepción, Ñuble, Arauco and the Territory of Magallanes promise to furnish sufficient coal for many years to come, and the guano deposits, which are found on the islands and along the coast of the Province of Tarapacá, are among the most important and valuable mineral products of the country.

Other minerals of minor importance are borax, common salt, iodine, cobalt, mercury, nickel, iron, limestone, gypsum, feldspar, slate, marble, jasper, agate, lapis-lazuli and zinc.

The history of mining in Chile is closely interwoven with the history of the country, and a study of the former necessarily leads to a study of the latter. The Incas early realized the importance of the Chilean gold mines, and took possession of the country, only to be in their turn dispossessed by the Spanish conquistadores, such as Pizarro, Almagro and Valdivia, who in their thirst for gold were willing to brave the perils of the long march across the deserts, and many of whom perished in the effort.

The nitrate industry seems to date back only as far as 1826, when Hector Bacque, a Frenchman, established nitrate works at Noria, who was, however, quickly followed by others, who realized the importance of nitrate as a fertilizer and began to develop the nitrate industry along more modern lines. There are today over 100 nitrate companies in Chile, with an aggregate capital of $100,000, employing some 13,000 laborers. The commerce of the ports of Pisagua, Junin, Caleta

Buena, Iquique, Patillos, Tocopilla, Mejillones, Antofagasta, Paposo and Taltal consists mostly of nitrate exports.

Between the years 1830-1891 about 20 million tons of nitrate were exported, but for some time past the Chilean mine owners have formed a combine, restricting the output of each mine and thus regulating the total production in accordance with the probable consumption. In the year 1905 the total production amounted to 16,901,735 metric quintales (169,000 tons), of which 16,698,064 metric quintales (167,000 tons) were exported and the balance used in the country.

A considerable number of the gold mines formerly existing in Chile have been exploited and practically exhausted by the early Spanish conquistadores, such as the Quillota and Limache gold mines and those of Tucapel, Arauco, Valdivia and the famous Madre de Dios mines, which latter, however, is said to have been rediscovered and is now being worked again.

Near Antofagasta are situated the famous Caracoles silver mines, at an altitude of 10,000 feet above sea level. Silver is also found in the district of Taltal and near Chañaral, in the department of Copiapó. Silver was at first treated in a very primitive way in Chile, but when more modern methods were adopted it was found that the refuse, which was formerly thrown away, contained as much as 60 ounces of silver per ton.

Copper is, however, the most important industry in this district, and next to nitrate the most important mining industry in Chile. The Algarobo, Puginos, Tierra Amarilla, Papillon, Paipote and Chañarcillo are some of the more important copper mines, most of these mines being equipped with thoroughly modern and up-to-date machinery and appliances. Mond gas is used to generate electricity, and electric installations for rockdrills, pumps, etc., are to be found in a good many of the plants.

As the excellent qualities of the Chilean coal become better known, coal mining assumes larger proportions, the Chilean coal being used now not only in Chile by most of the factories for the generation of steam, but also by the various steamship lines touching at Chilean ports, some of them taking on sufficient coal to last them for their trip to Europe and return. The tertiary forests, the remains of which form the lignite coal of Chile, extended from Tomé, in the Bay of Concepción, down to about Cañete, in the Province of Arauco, although there are also coal mines at San José, near Valdivia and near Punta Arenas.

The largest coal mines in Chile are those of the Cousiño Company at Lota, which are said to produce from 800 to 1,000 tons per day. There are three seams, two of one meter and one of 1.6 meters thickness. A curious fact about these mines is that the strata dips to the west, so that they extend considerably under the Pacific Ocean, and mining is carried on extensively under the sea.

The total production of minerals and the exports are shown in the following tables, covering the period from the years 1896 to 1905, inclusive:

MINERAL PRODUCTION OF CHILE. (*a*)
(In metric tons.)

Year.	Borax.	Coal.	Cobalt Ore.	Copper.	Gold. *Kg.*	Guano.	Iodine.	Salt.	Silver. *Kg.*	Sodium Nitrate.	Sulphur.
1896		(*c*)	(*d*)	23,649	1,634	(*f*)	(*e*)	2,434	150,480	1,158,088	940
1897		(*c*)	(*d*)	21,128	1,538	(*f*)	(*e*)	5,867	140,732	1,148,696	664
1898	86,892	(*c*)	(*d*)	26,331	2,037	(*f*)	(*e*)	6,684	131,995	1,283,563	1,256
1899	(*b*)	(*c*)	(*d*)	25,719	2,060	(*f*)	274	9,937	129,503	1,389,823	989
1900		(*c*)	(*d*)	25,715	1,975	(*f*)	302	9,879	73,071	1,460,100	2,472
1901		(*c*)	(*d*)	30,155	1,100	(*f*)	269	10,099	70,237	1,273,800	2,516
1902		(*c*)	(*d*)	27,066	1,286	(*f*)	242	9,532	57,418	1,400,408	2,636
1903	16,879	827,112	290	29,923	994	11,134	387	16,264	28,552	1,444,920	3,560
1904	16,733	751,628	125	31,025	1,135	2,669	461	17,674	28,501	1,487,598	3,594
1905	19,612	793,927	28	29,126	1,055	19,380	564	12,108	16,315	1,669,806	3,470

(*a*) From *Estadistica Minera de Chile.* (*b*) The combined output of the years 1894 to 1902 inclusive. (*c*) The combined output of Chile up to the end of 1902 is estimated at 20,650,000 tons. (*d*) The combined output of Chile up to the end of 1902 is estimated at 5,941 tons. (*e*) Not reported. (*f*) The combined output of Chile up to the end of 1902 is estimated at 163,704 tons, valued at 5,041,560 pesos ($1,840,169).

MINERAL EXPORTS OF CHILE. (*a*)
(In Metric tons.)

Year.	Borate of Lime.	Coal.	Cobalt Ore.	Copper Matte.	Copper and Silver Matte.	Copper, Silver and Gold Matte.	Copper Ore.	Copper and Silver Ore.	Copper, Silver and Gold Ore.	Copper Ingots.	Gold Bullion *Kg.*
1896	7,486	204,858		2,528	1,059	7.6	6,159	62.3	29,542	20,592	1,061.3
1897	3,154	243,968	6.0	2,519	904		3,396	161.8		19,011	1,131.7
1898	7,028	282,663	18.2	3,079	419	17.8	20,301	87.0	5,733	20,600	1,630.5
1899	14,951	241,995	55.	1,710	1,094	93.0	35,854	184.0	12,000	17,311	1,625.0
1900	13,177	325,042	26.8	4,838	1,918	241.8	20,213	238.5	360	20,340	1,871.1
1901	11,457		76.0	2,905	1,779	208.0	15,921	119.0	60	24,480	637.0
1902	14,327		464.0	2,094		220.0	22,622	133.0	2,000	21,197	762.0
1903	16,879	200,000	284.5	2,689	864	863.6	17,961	89.8	440	22,196	207.5
1904	16,733	213,262	125.0	472	460	1,092	21,899	88.3	1,152	26,442	397.0
1905	19,612	227,800	28.6	2,657	2,656	1,658	17,045	36.2	1,211	23,410	328.7

Nitrate.

The following description of the nitrate belt of Chile has been especially prepared by Mr. J. F. Campaña of the Bureau of Nitrate and Guano Deposits (Delegacion Fiscal de Salitreras y Guaneras) at Iquique:

"The nitrate zone is situated in the northern part of the Republic, and embraces the region lying between the Camarones River, latitude 19° 11′ on the north, and latitude 27° on the south, contiguous to the port of Caldera, extending from north to south over a space of 750 kilometers (466 miles). The shortest distance of this belt from the coast is at its northern extremity, where it lies within 25 kilometers (15½ miles) of the sea, while its greatest distance is at the southern end of the zone, where it approaches within 150 kilometers (90 miles) of the Pacific.

"The deposits of nitrate, in the province of Tarapacá, are found on the small slopes and gently undulating hills which extend to the west of the pampa of Tamarugal, while to the south of the Loa River the deposits do not follow any regular order of distribution, but are found

in the midst of great plains and on the slopes of some of the hills. They are, however, always present in the nitrate zone, which extends at a distance of from 60 to 150 kilometers (35 to 90 miles) from the coast. This short distance separating the zone from the sea facilitates transportation to the neighboring ports, which may be connected by means of railways passing through the cañons which cross the mountain chain of the coast.

"The saltpeter, or rather nitrate of soda, is found mixed with other substances, forming an irregular cap or covering frequently broken by sterile portions, the principal ingredient of which is common salt, or simply a conglomerate of clay, gravel, sulphate of soda, etc. The cap or blanket containing the nitrate is found at a very slight depth, covered by a deposit of the conglomerate referred to, which generally is entirely sterile, but in some places, principally in the northern part of the zone, contains a fair percentage of nitrate. The percentage or grade of nitrate of soda in the deposits or substances in which it is contained varies greatly, the richest grades being found in the Province of Tarapacá, the average percentage exceeding, in some places, 60 per cent. In the southern portion of the zone the grade of the crude nitrate or *caliche* diminishes, the average richness being calculated at 30 per cent.

"The name of *caliche* is given to the crude saltpeter or substance which contains the nitrate, and is found associated with common salt, sulphate of soda, clay, and other foreign substances. The extent or thickness of the *caliche* varies considerably, between 30 centimeters and 1 meter (1-3.28 feet). Deposits of greater thickness are sometimes found, but this is an exception; such deposits are never large.

"1. *Layer of chuca.*—This is a kind of earthy clay, very fine and loose. The thickness of the stratum of *chuca* does not usually exceed 30 centimeters, but in very exceptional cases it may be of a greater depth.

"2. *The second stratum or costra.*—This is the layer which immediately covers the *caliche*. It varies in thickness, between 20 centimeters and 3 meters (8 inches to 3 feet), and in some cases exceeds this thickness. The thickness of the deposit shown is 2 meters 11 centimeters (7 feet).

"3. *The caliche or third layer.*—This is the stratum which contains the nitrate, and, as previously stated, varies greatly in thickness in different localities of the nitrate zone.

"4. *The Conjelo and Cova.*—This is the final stratum which rests upon the bed rock. It is formed of a mixture of common salt, various sulphates, and other salts, but does not contain nitrate. This layer also greatly varies in thickness.

"The exploitation of the *caliche* or crude nitrate commences by removing from the deposit the clay stratum, called *costra,* which covers it. The clean *caliche* or crude nitrate is then taken to the refining plants, where it undergoes a process of purification based on the great

solubility of nitrate of soda in boiling water, a solubility superior to that of any of the other salts with which it is combined. The solutions are then immediately drawn off into large settling or crystalizing tanks where the nitrate of soda crystalizes, as does also the potassium nitrate, which is generally present in small quantities, together with a little common salt and a small quantity of sulphates and impurities. The grade of the resulting crystalized nitrate is 95 per cent of nitrate of soda, known under the name of ordinary or commercial nitrate.

"Refined nitrate of a purity of 96 per cent is also obtained by subjecting the hot solutions to a slight and short decantation, by means of which a portion of the salt and impurities which the solutions contain settle, after which the solutions are drawn off into the crystalizing tanks. In this process powerful engines are used, the refining capacity of which is up to 10,000 quintals of nitrate daily.

"There are in the entire nitrate zone 84 refineries which produce on an average 2,675,341 Spanish quintales (271,841,399 pounds) of nitrate per month.

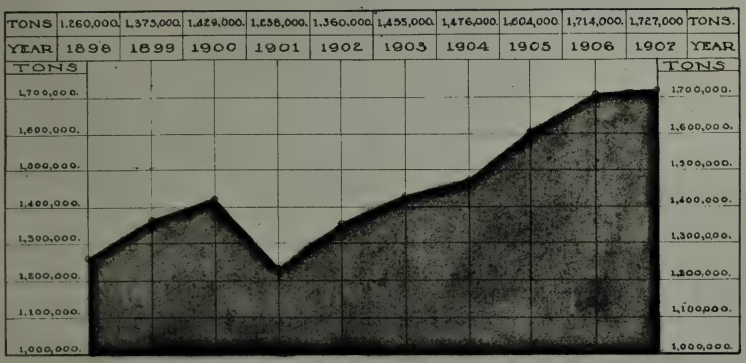
"The first exports of nitrate were made in 1830, and were continued on a small scale until 1882, after the war with Peru, which gave Chile the possession of this territory. In 1882 the exports of nitrate rose to 10,701,000 Spanish quintals, and large quantities of exports of nitrate continued to be made until 1900, in which year the nitrate exports aggregated 31,741,293 Spanish quintals. Beginning with that year the exports of nitrate decreased, owing to the effects of the nitrate combination, until 1903, when a slight increase was again noted.

"The annexed table shows the exports of nitrate made from 1830 to 1905, inclusive:

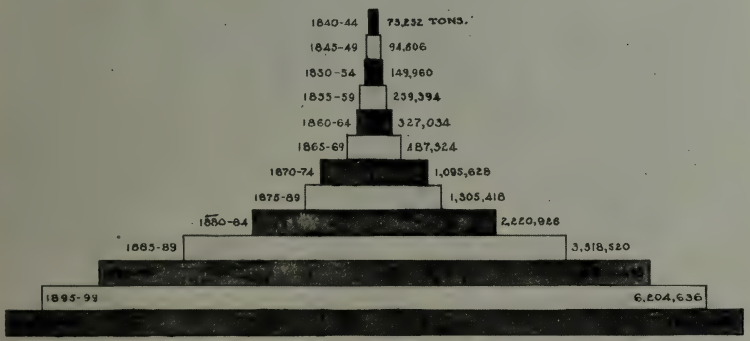
EXPORTS OF NITRATE FROM 1830 TO 1903, INCLUSIVE.

Year.	Spanish quintals.	Year.	Spanish quintals.
1830 to 1834	361,386	1884	12,152,000
1835 to 1839	761,349	1885	9,478,000
1840 to 1844	1,592,306	1886	9,805,000
1845 to 1849	2,060,592	1887	15,495,000
1850 to 1854	3,260,492	1888	16,682,000
1855 to 1859	5,638,763	1889	20,682,000
1860 to 1864	6,979,208	1890	23,373,000
1865 to 1869	10,594,026	1891	18,739,000
1869	2,507,000	1892	17,478,000
1870	3,943,000	1893	21,076,354
1871	3,607,000	1894	23,978,983
1872	4,421,000	1895	27,401,297
1873	6,264,000	1896	25,175,832
1874	5,583,000	1897	24,971,648
1875	7,191,000	1898	27,903,553
1876	6,317,000	1899	30,213,532
1877	4,991,000	1900	31,741,293
1878	7,023,000	1901	27,691,298
1879	3,161,000	1902	30,089,440
1880	4,869,000	1903	31,694,954
1881	7,739,000	1904	32,696,180
1882	10,701,000	1905	36,717,472
1883	12,820,000		
		Total	638,312,556

ANNUAL EXPORTATION
—OF—
CHILEAN NITRATE.



EXPORTATION OF CHILEAN NITRATE
—BY—
FIVE YEAR PERIODS.



ANNUAL EXPORTATION OF NITRATE.

Showing the annual exports from 1898 to 1907, inclusive, and for five-year periods from 1840 to 1904, inclusive.

"The excellent results obtained from the intelligent use of nitrate fertilizers are well known, the yield in some crops being from 25 to 30 per cent greater than those obtained from lands on which nitrate fertilizers were not employed. In some cases the yield has been much larger than that mentioned, and this is the cause of the considerable increase in the consumption of nitrogenous fertilizers in the markets of the world.

"In 1901 the total consumption of nitrate in the world was 31,337,872 Spanish quintals, or an excess over that of the previous year of 894,832 quintals. This increase in the consumption is due to the policy pursued by the "Asociación Salitrera de Propaganda" (Nitrate Propaganda Association), to which the state paid a subsidy of £20,000.

"The quantity of nitrate obtainable, estimated for the entire nitrate zone, on December 31, 1899, was approximately as follows:

TARAPACA ZONE.

	Quintals.	
Nitrate on the lands of private persons		407,160,000
Nitrate on Government lands, deposits under operation valued at	84,866,537	
Nitrate on Government lands, deposits surveyed and valued at	81,021,976	
		165,888,513
		573,048,513

TOCO ZONE.

Nitrate on the lands of private persons	138,112,000	
Nitrate on Government lands, deposits under operation valued at	87,726,769	
		225,838,769

AGUAS BLANCAS AND ANTOFAGASTA ZONE.

Nitrate on lands of private persons	153,000,000

TALTAL ZONE.

Nitrate on lands of private persons	151,984,500
Total	1,103,871,782

"To the foregoing estimate should be added the nitrate deposits that may exist on the plains, the extent of which is as yet unknown, not only in the district of Tarapacá, but also in the southern zones.

"The Orcoma plain is situated in the district of Tarapacá. Low-grade nitrate deposits have been discovered in this plain, which may eventually be profitably worked, but not, however, as long as there are richer deposits from which nitrate can be extracted, and especially while the price of the product remains low. There are also nitrate deposits in the north of Pisagua, in the Tacna plain, but they are small in extent and are isolated from each other. On the eastern side of the Tamarugal, in the northern plain, deposits of low-grade nitrates have been discovered, but not sufficiently rich to be profitably developed.

"Prospecting has been done between Lagunas and Toco, but without satisfactory results, as only one thin, unimportant layer of nitrate has been discovered in the Escalerillas plain. On the right bank of the Loa River, opposite Toco refining plant, in the Joya plain, some excavating has been done, exposing to view crude nitrate or *caliche* of a good grade. These deposits, which may be of great importance, will soon be surveyed and studied in detail.

(*a*) (*b*)

NITRATE AS A FERTILIZER.

The above illustrates the results obtained with nitrate used as a fertilizer, showing (a) wheat planted without nitrate, and (b) with nitrate.

"To the south of Toco investigation and analysis of nitrate deposits are now being made, and nitrate of a good grade was found in the first shafts sunk. Prospecting will be continued until the plains of Antofagasta are reached. In these plains, as well as in those of Aguas Blancas, the public lands containing nitrates are of very limited extent. One of the places in which nitrate may exist in paying quantities is in the Taltal plain, but it has not yet been possible to make investigations there owing to the settlement of claims now before the court at Taltal.

"South of the Pan de Azúcar cañon lies the Jardin plain, between Chañaral and Pan de Azúcar, where *caliche* or crude nitrate of a fair grade is found, but the deposits do not appear to be very extensive. Estimating the quantity of nitrate on these lands, which have not yet been thoroughly explored, at 500,000,000 quintals, the total estimated nitrate deposits in the entire nitrate zone aggregates 1,603,871,782 quintals.

"Supposing the total stock of available nitrate in the large nitrate deposits to be 1,603,871,782 quintals, and estimating that the annual exports will average 35,000,000 Spanish quintals, a quantity which will probably be exceeded very soon, the stock on hand referred to will last about forty-six years. After exploitation on a large scale has ceased, the remaining nitrate which may have escaped present methods, as well as the residues designated at the present time under the name of *ripios* or waste, and which contain less than 15 per cent nitrate, will form the basis of a nitrate export industry for many years. The output, however, obtained from this source will be small compared with the production at the present time.

"The nitrate zone is supplied with the following railways:

Railways.	Gauge. Meters.	Length. Kilometers.	Miles.
Arica to Tacna	1.45	63	39
Iquique to Pisagua	1.45	200	124
Iquique to Lagunas	.....	142.22	88
Branches of La Granja, San Antonio, etc.	.....	187.38	116
Junin and branches	.76	105	65
Agua Santa and branches	.76	122	76
La Granja to Challacollo	.76	36	22
Elevated railway to Patillos mines	.....	3.352	2
Lagunas (not in operation)	.76	90	56
Tocopilla to Toco	1.07	87	54
Branch to Santa Fe	1.07	25	15
Antofagasta to Oruro (922 kilometers) Chilian section	.76	442	275
Taltal to Cachinal and its branches	1.07	212	132
Chañaral to Pueblo Hundido	1	90	56
Antofagasta to Aguas Blancas	.76	119	74

"These railways start from the ports named and extend into the interior of the country until an elevation of 1,200 meters (3,936 feet) above the level of the sea is reached. The roads from Caleta Buena and Junin, however, are exceptions to this rule, as they extend from the crests of the neighboring cordillera or mountain chain to the sea and are connected with the shipping ports by means of elevated tracks.

The railway from Granja to Challacollo crosses the Tamarugal plain and runs to the foot of the Challacollo Mountain. From this point a suspension railway extends to the mines situated on the summit of the mountain at an elevation of 1,400 meters (4,592 feet) above sea level.

"There are great tracts of nitrate lands belonging to the State that have been surveyed and appraised by the Government for the purpose of sale at public auction. These sales are made as the nitrate lands belonging to private persons become exhausted, the nitrate industry thus acquiring new fields of exploitation in order to meet the steadily increasing demand for this useful product.

"Owing to an agreement made for the purpose of limiting the production of nitrate in such a manner as to be within the demands of consumption, the price of the article has been maintained within profitable bounds, insuring thereby to the producer fair returns on his capital and labor. The average price for the year ending December 31, 1901, was about 6s. 6d., or a price sufficiently remunerative to redeem the value of the land under operation before the deposits were exhausted. This land, after the termination of the nitrate exploitation, is valueless, as is also the machinery and plant used in the refining process.

"The maritime freight to Europe varies greatly, fluctuating usually between 20 and 30 shillings a ton.

"Coal, which is used in large quantities, is another important factor in the production of nitrate. The annual consumption of coal in this industry is not less than 400,000 tons, the price per ton ranging from 22 to 28 shillings. English or Australian coal is generally consumed. Domestic coal is used in very small quantities in the nitrate industry because the native production is insufficient to meet the demand of the railways and other industries in the southern part of the Republic, as well as the heavy demand of the steamship companies for Chilean coal at the ports in the vicinity of the coal mines, and so it happens that the vessels carrying the nitrate to foreign markets return laden with the coal necessary for the nitrate industry."

The total production of nitrate for the nitrate year 1906-7 was 40,141,522 Spanish quintales, and for the nitrate year 1907-8, 41,179,058 Spanish quintales, while the exports amounted to 37,843,000 and 39,875,735 quintales respectively.

In order to maintain the price of nitrate and to prevent an overproduction, which threatened to reduce the prices considerably, the Chilean nitrate owners formed a combine in the year 1900 under the name of the Chilean Nitrate Association, which Society regulates the output of nitrate in Chile and thus maintains the equilibrium between production and consumption. The original agreement was for six years and ended in the year 1906, when it was again renewed for another three years, and will expire on March 31, 1909. It seems to have worked so satisfactorily, however, that the majority of mine owners are in favor of a renewal.

By a law enacted in 1880 the exportation of nitrate was taxed $1.60 Chilean silver currency per metric quintal. At the value silver possessed at that time the tax was equivalent to $1.21 United States currency. This law was amended in 1897 and the tax fixed at 3.38 pesos Chilean gold ($1.19). The following table shows the amount of the tax collected for every five years and the annual average for each period, the amounts being stated in United States currency:

Period.	Amount collected.	Annual average.
1880-1884	$27,399,955	$ 5,479,591
1885-1889	40,940,581	8,188,116
1890-1894	59,386,246	11,877,229
1895-1899	76,990,713	15,398,142
1900-1903 (4 years)	68,314,854	17,076,214
Total	$273,032,349	.....

Copper.

Chile's wealth in copper has long been renowned, and about sixty years ago her output in this metal amounted to one-third of the world's entire production. There is still a certain class of unrefined copper of very low grade, distinguished as 'Chile Bar.' Formerly only oxidized copper ores were worked, and all pyritic ores were thrown into the dump. It was not until 1840 that engineer Francis Lambert made known the importance of these sulphides which have since constituted the chief source of production.

The ruins of small primitive furnaces worked with bellows, in which copper was obtained in a single smelting, show that ever since the conquest copper has been reduced and worked in Chile. A mummy partly turned into copper, found not many years ago in an old mine, at Chuquicamata, Province of Antofagasta, has been taken as a proof that these mines were worked centuries ago. During the last century there was a flourishing period for the copper industry in Chile, when the highest mark of production was reached by the famous mines of Taltal, Flamenco, Cobija, Copiapó, Carrizal, and especially the mines of Coquimbo Province, such as Tamaya, Tambillos, Higuera, Brillador, as well as those farther south in the districts of Caleu, Quillota, Catemu, Las Coimas, near San Felipe; Tiltil, Las Condes, near Santiago; Rancagua, etc.

Up to eighteen or twenty years ago Chile produced as much as 40,000 tons of copper per annum, but of late this output has decreased to about 27,000 tons. This falling off is due, among other causes, to the exhaustion of the principal mines, some of which are 2,400 feet deep; to the lower price of the metal, and to the scarcity of labor since the miners left for the nitrate fields and silver mining districts.

The principal mines at the present time are, from south to north, the following:

In the Provinces of Santiago and Valparaiso, the mining center of Las Condes with its rich copper pyrite mines Los Elguin, Bronces,

Transito, Volcan, in Maipo, and several other districts, such as Naltagua, Tiltil, Lampa, etc., which as yet are not very well developed. In the Province of Aconcagua greater activity is being shown in the working of the Catemu mines, those near San Felipe and Los Andes, and those of Melon, Ligua, etc. The Province of Coquimbo is again growing in importance as a copper producing center. New mining works are being started in the Departments of Illapel and Combarbalá, and in the Department of Ovalle, some mines at Tamaya are again being worked. The mines of La Higuera could be rendered again productive if their lower levels were drained. The same may be said of the Tambillos group and many other mines of this Province, which offer many favorable conditions, such as the ancient mines of Andacollo, Panulcillo, Punitaqui, etc. Atacama is the Province which at present offers the best prospect for greater production and the most promising future.

In the Department of Vallenar many copper mines, such as Camarones, San Antonio, etc., will be successfully worked when the railroad between Vallenar and Serena is finished. The Department of Freirina is notable for its rich mines at Carrizal, Las Jarillas, Astillas, etc., and the Fraguita, Santa Rosa, mine. The copper centers in the Department of Copiapó are too numerous to mention, the principal being Dulcinea, near Puquois, belonging to an English company, which after a long unproductive period has lately yielded, at a considerable depth, many millions of dollars and is still richer than ever. The Department of Chañaral, once famous because of the mines of Chañaral de las Animas, is bound to become again a great copper producing district.

The railroad consists of two branches, one connecting the Port of Chañaral with Chañaral de las Animas, a distance of 29 kilometers, which is being extended to Pozo; and the other with Pueblo Hundido, a distance of 68 kilometers, and which is being extended to Inca. An English company has lately purchased* the principal mines of this district, and after draining them they expect to be able to work the rich copper pyrites which made Chañaral so famous. Work was started in the Fortunata mine at a depth of 1,400 feet, powerful pumps were installed and the inspection of the three veins which run east-westerly was begun. Work was also begun in the Capitana, Elena and Placeres mines, but the result was not satisfactory. The only mine being worked with some activity is the Fronton of Srs. Besa, which produces monthly about 300 tons of pyrite copper ores, containing about 12 per cent of copper. In view of the exhaustion of these mines, of the presence of water at a depth, and of the local conditions, it is not very probable that high grade ores will be found at the greatest depths, but it would be well to make an inspection of some of the veins, by cuttings in the tunnels, which has not been done so far.

"Further south the Pozo mining district promises a bright future. Some mines are now being worked—colored ores—to advantage, and

*Vattier, Notes on Mining and Metallurgy in Chile.

when the railroad reaches Pozo, within a year, the workings will be developed. The Verde mine of Srs. Besa is situated in this district and abounds in oxidized copper ores in an argillaceous gangue with about 7 per cent copper.

"Thirty-six kilometers (85 miles) from the Port of Chañaral, going towards Pueblo Hundido, we find the Salado mining district, which, in addition to the old El Limbo, now shows new mines properly developed. The peculiarity of these mines, in a district of oxidized ores, is their producing at a slight depth sulphide ores, which are very valuable there for smelting. This fact should interest mining people.

"To the east, 50 kilometers (164 miles) from the port, with a short railroad branch, the Carmen mines of Sr. S. Valdivieso are being worked very successfully. They produce chiefly ferruginous carbonates and oxides of copper with signs of sulphur. The mean grade of these ores is from 7 to 8 and from 12 to 14 per cent when selected. The ores that have been thrown on the dumps, containing 2 to 3 per cent of copper and 50 per cent of iron are also utilized, being sold to the metallurgical works of Antofagasta as flux for silicious ores. The lodes and seams are as wide as 30 feet, and separated by masses of sienite, diorite and other rocks.

"The present terminus of the railroad branch is Pueblo Hundido, where the Tres Gracias mines of Sr. B. Caceres are situated. Few mines in Chile yield such an abundance of uniform copper ores of low grade, but of a ferruginous composition, which makes them particularly valuable as basic flux for other metallurgical works which do not possess this element.

"On the hill four important veins, running almost parallel in an east-westerly direction and dipping to the north, of iron oxide, with from 7 to 8 per cent copper, have been found, and a selection of these gives considerable ore containing 12 to 14 per cent copper. These veins, as yet not thoroughly surveyed, are of great thickness and uniform composition. The working is done by drifts and shafts, and the ores are hauled on small cars from the interior depths to the railroad station. A lode of colored ore of earthy formation, worked from the surface, running south and north, with an inclination to the west, has lately been found to join one of the principal ferruginous seams in the lower part of the hill, giving rich oxidized copper ores mixed with sulphides of a high percentage of copper. This find will probably grow in importance at a greater depth and extent."

The Province of Antofagasta is daily growing in importance as a copper mining district. In the Department of Taltal, at a distance from the sea-coast, there is the "Esploradora" mine, which yields large quantities of high grade copper ores, and has dumps which will be of great value when freights are lowered by better transportation facilities. The Papozo mines belonging to the Barazarte estate, and which have been so productive, are fitted out with most complete and modern mining and metallurgical plants. In the celebrated Guanaco

gold mining district a very curious geological phenomenon has been observed, and that is, that at a certain depth, in many of the mines in this district, gold has disappeared to a great extent, and has been replaced by rich copper ores, which at present are extracted on a large scale. There are other promising mining districts, such as Aguas Verdes, etc. The predominating copper ore in these districts is copper silicate, blue and black, carbonates and atacamite. The mining district which at present attracts most attention is the district of Chuquicamata, near Calama, in the Department of Antofagasta. Deposits of oxidized ores of copper, carbonates and atacamite, have been discovered on the surface, as well as lodes which are successfully worked at a certain depth. The mining districts of Sierra Gorda, Chiuchiu, and Conchi, at a short distance from the railroad between Antofagasta and Bolivia, are also worked actively. In the Department of Tocopilla the Cobija and Tocopilla copper mines continue their great production.

The following list, prepared by United States Consul Mansfield, at Valparaiso, shows the establishments mining copper in Chile, as well as the department in which the respective mine is situated, the year in which it began operations, the kind of product and the output of each, and the depth of the mine.

Department.	Name of mine or establishment.	Name of owners or proprietors.	Year established.	Kind of products.	Annual production. *Tons.*	Depth of mine. *Feet.*
Lautaro	Lota	Compañia Esplot. de Lota y Coronel.	1856	Bars and ingots.	7,000	
Rancagua	Puquios	Compañia de Minas y F. de Puquios.	1897	Regulus	Not given.	
Melipilla	Natalgua	Compañia Minera de Naltagua.	1898	do	Not given.	
Victoria	El Volcan	Compañia Minera de Maipú.	1884	Bars	500	320
Santiago	Maitenes	Compañia Esplot. de Lota y Coronel.	1884	do	500	
	Central	Francisco de P. Perez	1880	Regulus	250 to 300	
	Tiltil	Sociedad Colectiva	1900	do	Not given.	
Putaendo	Máquinas de Catemou	Sociedad de M. de C. de Catemou.	1870	do	125	
	Nilgue	do	1866	do	500	
Quillota	Fundicion de Llaillai	Guillermo Carvallo	1900	do	500	170
	El Cobra de Melon	Sociedad de M. de C. de Catemou.	1885	do	150	
La Ligua	Peña Blanca	Otto Harnecker	1888	do	150	230
	Cabildo	Sucesion Cerveró	1866	do	800	390
	Los Anjeles	Sociedad Española de Fundicion.	1899	do	300	
Petorca	Las Palmas	José R. Espinoza	1880	Bars	100 to 500	170
	Cantarito	do	1898	do	50	230
	Mauro	Francisco Vergara I.	1860	Regulus	100	500 300 170
Illapel	Chalinga	José Tomas Ramos	1854	do	Closed.	230
	Geisse Hnos.	Geisse Hnos.	1875	do	150	160
	Quilomenco	J. M. Echavarria	1892	Bars and regulus.	100	
Combarbalá	El Espino	Sucesion Francisco Geisse Castellanos y Compañia.	1896	Regulus	25	
				Bars and regulus.	75	
Chañaral	Chañaral	Copper Corporation of Chile.		Regulus	1,100	1,400
		Besa y Compañia	1880	do	1,300	650
Antofagasta	Playa Blanca	Compañia Huanchaca de Bolivia.	1892	do	2,000	
	Fundicion Templeman	Compañia Limitada	1897	Bars and regulus.	1,600	
Cobija	Gatico	Artola Hnos	1861	Regulus	1,200	
Tocopilla	Buena Vista	Gmo. E. Carne y otro	1880	do	Closed.	
Ovalle	Panulcillo	Central Chile Copper Company.	1895	do	1,400	320
	Tongoy	Sociedad Chilena de Fundiciones.	1860	Bars	700	
	Guayacán	do	1856	Bars and ingots.	8,000	
Serena	La Compañia	Sucesion C. J. Lambert	1850	Bars	700	180
	Higuera	F. Vicuña	1855	Regulus	1,000	980
Huasco	Astilleros	Santiago Vicuña	1890	Bars	600	
Freirina	Arenillas	Socieded Minera del Morado.	1860	Regulus	Closed.	590
	El Jirio	Santiago Vicuña	1896	Bars	1,000	
	Labrar	Sucesion P. Gonzalez M.	1900	Regulus	700	
	Canto del Agua	Sucesion Ovalle	1870	do	600	
	Chañaroitos	Sociedad de M. y F. de Carrizal.	1857	do	1,800 to 2,000	
Vallenar	Las Breas	Sociedad Minera El Orito.	1888	do	700	620
Copiapó	Tierra Amarilla	Sociedad Industrial de Atacama.	1857	Bars and regulus.	2,000	650

In addition there are some thirty or more copper mines in the Department of Copiapó, an idea of the production, etc., of which can be obtained from the following table:

Name.	Location.	Depth.		Monthly production.		Class of metals.
		Meters.	*Feet.*	*Tons.*	*Per cent.*	
Dulcinea	Puquios	410	1,345	1,200	16½	Sulphides and carbonates.
Republicana	do	250	820	10	17	Carbonates.
Descubridora	Chico	110	361	50	12	Sulphides.
Antonia	Ojanco	60	197	30	16	Carbonates.
San Francisco	do	340	1,115	300	16	Sulphides and oxides.
Carmen Alto	do	225	738	30	14	Carbonates.
Do	Morado	140	459	25	22	Sulphides.
Fortuna	do	60	197	30	18	Do.
Viuda	Algorobo	270	886	800	13	Do.
Descubridora	do	160	525	20	16	Do.
Estaca	do	190	623	30	15	Do.
Emeliana	do	90	295	80	18	Carbonates.
Fortunata	do	140	459	80	20	Carbonates and sulphides.

The majority of the rock in which these ores are found is granite, with a small per cent of andesite, porphyry, and syenite.

Coquimbo.—The Intendente of the Coquimbo district states that no statistics are kept of the production or working of mines in that territory. There are in the district 1,883 mines which paid working license for the year 1902. The claims are for a total surface right of 12,345 acres of land, for which the sum of $32,400 in Chilean currency was paid. These mines are classified as below:

Copper	1,398	Copper and gold	33
Silver	154	Silver and lead	6
Silver and gold	1	Manganese	61
Silver and copper	47	Quicksilver	9
Gold	165	Copper, silver and gold	1
Iron	4	Gypsum	1
Cobalt	2	Lapis	1

Coronel.—There are no copper, silver, or gold mines in the Coronel district, coal being the only mineral product of that locality.

Talcahuano.—There are no detailed statistics available concerning mines or mining in this district. No copper or silver is mined, and the production of gold for the entire district was estimated at $10,000 last year. The gold is mined in a small way, there being no large companies operating in that part of the country.

No copper or silver mines are to be found in the southern part of Chile. Gold mining is carried on to some extent in the Territory of Magellan and Tierra del Fuego, the claims, however, being usually worked by small squads of men and scattered over a considerable extent of territory.

The following is a description of the copper mines in the Department of Antofagasta:

"*Chuquicamata.*—This mineral district is located 12 miles north of Calama, and is connected with the port of Antofagasta by a railway, the total distance being 163 miles; freight, $1.40 per metric quintal, or, say, $4.50 gold per ton. The district comprises 8 square miles; height above sea level, 9,000 feet. There are about six principal mines, averaging 300 to 350 feet in depth.

"The country rock is pure granite, having 200 feet of decomposed granite and rhyolite on the surface. The lodes are true fissure lodes,

but not well discernible on the surface, owing to the decomposed state of ground. The ores are chiefly atacamite (oxychloride), anhydrant sulphate, sulphates, silicates, cuprite, and black sulphides; gray copper and sulphites are also abundant. The atacamite is spread over the upper part of the ground and is disseminated through the entire rock, forming hills of 'smalls' called 'llampas.' There are at least 15,000,000 tons of decomposed rock, averaging one-half of 1 per cent of copper. At present this is sieved and picked up to 15 per cent.

"The chief mines are Poderosa, San Luis, Rosario del Llano, Zaragoza, Panizo, Constancia, Emma, Criselia, and Codiciada. The annual production of this district is 20,000 tons of ore, averaging 18 per cent. This production could be enormously increased if the upper rock were quarried on a large scale. The total absence of water prevents this at present.

"*El Abra.*—This mineral district is located some 30 miles farther to the northeast and connected with the same railway by a good cart road of 18 miles. The station is 190 miles from the port; freight from mines is $2.20 per metric quintal ($7.30 gold per ton). The height above sea level is 10,000 feet. There are only a few mines, all on the same lode. The principal ones are the Maria, Empalme, and the Laura; depth of working, 300 to 350 feet. The country rock is granite, both micaceous and hornblendic. The lode is well formed with a quartz gangue. The ore consists chiefly of silicates and yellow sulphurets; black sulphides and carbonates are also found. The annual production is 3,600 tons. This will be shortly increased, as a good ore dressing plant has been erected. The average is 19 per cent.

"*Conchi.*—This dictrict lies close to El Abra, but is not worked on any great scale. The workings are mostly filled up with dumps. The chief mine, Anita, is 330 feet deep. The lodes seem well formed in granite rock, and, judging from the excavations, the ores near the surface—chiefly carbonates and silicates—must have been abundant. The actual production per year is 1,000 tons of 15 per cent. The district is worth investigation.

"*Lomas Bayas.*—This mineral district lies about 30 miles to the south of the Antofagasta Railway, 60 miles from the port. It is connected with the station by a good cart road. Freight from mines to port averages $1.40 per metric quintal, or, say $4.50 gold per ton. The height above sea level is 6,000 feet. There are two good mines, the San Gorge and Andacollo. The country rock is micaceous granite. The lodes are well formed, of quartz gangue. The ores consist chiefly of carbonates, cuprite, brochantite, and gray copper. The depth attained is 550 feet, but from 250 feet downward only iron pyrites have been found, with some molybdenite. The annual production is 2,400 tons of 15 per cent.

"As in the districts previously described, there is no water in the vicinity, although a shaft has been sunk about 600 feet in the valley.

"*Desesperado.*—This mineral district is about 46 miles to the northeast of the port of Antofagasta, with which it is connected by a good

cart road. Some miners prefer taking the metals straight to nearest point on the railway, 56 kilometers (34.8 miles). Freight from mines to station, $1 per metric quintal; from station to port, 28 cents—a total of $1.28, or, say, $4.10 gold per ton.

"There are several mines, but none of much importance. Descubridora is 80 meters (262 feet) deep and Marta 100 meters (328 feet) deep. The annual production is only 1,000 tons of ore, averaging 18 per cent. The country rock is granite. Lodes of quartz average 2 feet in width and are well formed. The ores are chiefly carbonates and oxides. There is no water.

"*Naguayan.*—This district is quite close to the former, and with lodes having the same character. Some mines, like the Fortuna, have a great deal of specularite iron ore. This mine is 200 meters (656 feet) deep. The copper ores do not go down below 80 meters (262 feet) in any one of these mines, the percentage dwindling away gradually in the iron pyrites. The production, formerly, was quite 5,000 tons a year of 18 per cent ore, but today it is virtually nothing.

"*Chacaya.*—This is another mineral district in the same rock and with analogous lodes and metals. Some mines have produced rich bunches of ore, and the ores that are worked now, like the San José, yield similar eyes of 30 per cent ore, chiefly black oxides; but the lodes are very inconstant and do not tell in depth. This is close to the coast, and only a few miles north of Naguayan. A tunnel has been run into the hill 400 feet on the lode. The production is insignificant.

"*El Cobre.*—This mineral district has been worked to a large extent in former years. It lies immediately on the coast, about 42 miles south of Antofagasta. In the years 1850-1860 the production was large, but after being abandoned work was resumed three years ago with bad results. A tunnel 210 meters (688.8 feet) in length has been run into the hill off the lode, in very broken ground. The vertical depth attained is about 100 meters (328 feet). The principal mine is Pocas. The rock is granite and quartz lodes. The ores are carbonates, oxychlorides, and oxides. Small eyes of sulphurets have also been found. The present production is nil.

"There are several other districts on the coast—Hornos, Portezuelo, Blanco Encalada, etc.—all in granite, that have insignificant workings, which add a little to the general production.

"In the district of Callahuase, at an altitude of 12,000 or 13,000 feet, are surface workings to a depth of 60 feet, which have a lay of about 25 per cent copper. The lodes are from 3 to 4 feet wide. But little work has yet been done on account of the lack of transportation facilities.

"In the district of Copa Queri and the surrounding country, where copper claims have been taken up, the rock is of alluvial formation, from 3 to 30 feet in depth, in which is found copper of 4 to 5 per cent.

"On the western slope of the Andes is a group of mines owned by the Mocho Mining Company, which have been worked to a depth of

about 350 feet. During the past year about 250 tons of 30 per cent metal have been shipped from these mines. The mines are in stratified earth, and the metals are found in lodes 2 to 4 feet wide in beds of jaspar clay, quartz, and sulphate of lime."

The production of copper from the year 1844-1872 amounted to 770,204,270 kilograms; from 1873-1883 to 493,212,870 kilograms, and from 1884-1893 to 302,916,125 kilos. The following is a table of the yearly production of copper in Chile, from the year 1894 to 1905, inclusive:

	Kilograms.		Kilograms.
1894	23,273,542	1900	27,715,000
1895	22,386,821	1901	30,155,326
1896	23,649,307	1902	27,066,288
1897	21,127,974	1903	29,923,252
1898	26,331,068	1904	31,024,872
1899	25,718,783	1905	29,126,442

Silver.

In the history of Chile mention is made of rich silver mines which existed in the south after the conquest, and jewelry made of this metal is always found among the Araucanian Indians; but it is chiefly in the northern districts of Chile that silver mines have been worked. The production of silver in Chile reached its highest point in the Department of Copiapó, about half a century ago, when fabulous quantities of silver, the source of many a fortune, were produced during a period of thirty years at Chañarcillo, Tres Puntas, and other mines; in the Province of Coquimbo, at the Arquero mine; in the Department of Vallenar, at Agua Amarga, Tunas, and Vizcachas. Later on, the famous mines Florida and Japonesa in the Department of Chañaral; Caracoles in the Province of Antofagasta; Arturo Prat mines near Taltal; the Las Condes and Rio Blanco mines in the Province of Santiago, and Descubridora in Aconcagua near San Felipe were discovered. To attempt a description of these interesting silver deposits would be a lengthy task. The working of these mines has fallen off of late, largely on account of the great decrease in price of silver of recent years, but chiefly on account of the emigration of a great majority of the northern miners to the nitrate fields of Tarapacá, which give employment to about 16,000 workmen at higher wages than in the mines of other districts. With better transportation facilities and well organized prospecting this metal will undoubtedly regain its importance in Chile.

In working silver ores many modifications of the primitive process of simple amalgamation in tubs have been introduced. Within the last thirty years amalgamation has been made by Kronke's process in barrels with sulphate of copper and salt, and by Franke's in tubs with copper bottoms and cross-pieces, the ores having been previously roasted with salt to hasten the amalgamation. In the Province of Antofagasta chemical methods are also used, as calcination, solution and precipitation (by the Russell system), and direct lixiviation. At present the greater portion of the silver produced in Chile is obtained

by roasting the ores which on account of their composition (polybasite, galena, blende, tetrahedrite, etc.) leave too great a loss by amalgamation.

Silver ores which do not contain sufficient lead are smelted with compounds of this metal to produce bars containing about one per cent of silver. The lead is then concentrated until it contains from 20 to 25 per cent of silver, then cupelled; the silver thus obtained is then refined. Circular or rectangular blast furnaces with water jacket are used, the blast being furnished by Root or Baker blowers. The cupels are of English make with movable bottoms. Smelting of silver ores has also been made in these furnaces, sometimes with interior crucibles, to produce argentiferous copper matte, which is either exported to Europe or made into bars of argentiferous copper, in convertors, as is done in Maitenes, near Santiago.

The metallurgical works for silver now in operation are, from south to north: In the Province of Santiago: Las Condes district, San Enrique amalgamating and smelting works; Maitenes amalgamating and smelting works using silver and copper convertors; and Casino. In the Province of Aconcagua and Coquimbo, the small amalgamating works of Marqueza and Pelicano. In the same Province of Coquimbo there is a smelting plant for silver at La Compañia near Serena. In the Department of Vallenar some smaller amalgamating works are in operation, near Vallenar, in Camarones del Rio, and in Vizcachas. In the Department of Copiapó, among numerous amalgamating establishments, Chimba, Totoralillo, etc., there is an important smelting plant at Tierra Amarilla. In Taltal there are important amalgamating plants. The port of Antofagasta is at present the center of the most important silver smelting works. Here are located the Bella Vista, belonging to the firm of Templeman, and the Playa Blanca, belonging to the Compañia Huanchaca de Bolivia, in which ores from the south and north and from Bolivia, in addition to the ores of their own district, are smelted. The great works of Playa Blanca, for calcination and amalgamation, with seven shaft furnaces, etc., have cost about six million dollars in Chilean currency.

A firm of capitalists from New York, after having sent an engineer to examine the mines, works, etc., not long ago, rented the Playa Blanca establishment. In the interior of the Province of Antofagasta silver ores are worked on a small scale. Farther north, in Iquique, there are two important establishments for amalgamating silver ores, which are supplied chiefly from the mining districts of Huantajaya.

In the silver mines of Chile, some of which, at a depth of 700 feet or even more, have yielded fortunes after certain unproductive periods, there are important geological problems to be solved, as in the case of Chañarcillo, Tres Puntas and Caracoles, to find new workings. In the Province of Antofagasta the working of silver-bearing sphalerite ores containing more than 12 to 14 per cent of zinc, especially those imported from Bolivia, meets with serious difficulties. In roasting pulverized ores with salt and amalgamating them, which is an expensive

process, there is waste of silver always exceeding 20 per cent, and sometimes reaching 25 or 30 per cent. The smelting of these same ores, even though they be mixed with others free from blende, also presents serious difficulties, such as the production of lead or friable matter, which causes trouble in the latter part of the process, waste in slags, formation of crusts, etc.

Many experiments in the application of chemical processes after roasting have been made, such as the Broken-Hill (Australia) process, but up to the present time no practical results have been obtained. Working silver ores chemically is a matter worthy of attention, in view of the fact that in the interior of Bolivia some of these processes are applied with success. Electricity can also be used to advantage.

Antofagasta.—The two silver districts of importance in the department are Caracoles and Inca Caracoles.

Caracoles.—This district lies 110 miles from the coast, due east of the port of Antofagasta. It was discovered in the year 1869, and owing to the number and richness of the lodes the population reached 20,000 in 1876. Today this has been reduced to 500. Communication is effected with the port of Antofagasta by a good cart road, 24 miles in length, to the station Sierra Gorda, on the railway, which is itself 105 miles from the port. Freight from mines to port costs $15 a ton in Chilean currency, or, say, $5 gold. The country rock is limestone, gray and black, of the Jurassic formation, which is here and there broken up by porphyry. The lodes have calespar, gypsum, and baryta for a gangue or matrix, and the ores are chiefly chlorides, chlorobromides, iodides, and mixtures of chlorides and sulphides. The production of Caracoles has been estimated at 60,000,000 ounces fine silver. At present the production is very reduced, not exceeding 7,000 ounces per month. There are several shafts, ranging from 300 feet to 600 feet in depth, and there is one—the Deseada shaft—2,500 feet deep. The ore deposits are nearly all superficial, some zones only reaching a depth of 600 feet, where the ore is very poor. The ore is generally found in pockets or in chutes of limited sizes. Deep mining has been abandoned for several years, as the Deseada shaft and others have proved that the veins split up into small fissures. There are several mines still which require more careful study.

Inca Caracoles.—This mineral district was discovered soon after Caracoles. It lies 20 miles north of Calama, with which town it is connected by a good cart road, which makes a circuit 40 miles in length. Calama is 150 miles from the port by rail. Freight from mines to Calama is $12 in Chilean currency ($4 gold) a ton and $12 more to the port, equal to $8 gold in all. The country rock is porphyry; gangue, chiefly decomposed baryta, and peroxide of iron. The lodes are formidable, ranging from 3 to 6 feet in width. The ore is chiefly chloride, finely disseminated in all the lode and averaging 40 ounces to the ton. From 1872-1883 the ores were treated at an establishment on the River Loa, at Chacance, 45 miles distant, but since this was washed away by a flood very little work has been done owing to the absence of water and heavy freights. Once a pipe is

laid down to provide this mineral district with water this will be one of the most productive silver centers in the world, as there are an immense number of lodes and all contain 30 to 40 ounces of silver. The ore is splendidly adapted for lixiviation with hyposulphite, and does not require roasting. At present the price of water is $4 gold a ton. The principal mines are the Irene (300 feet deep), the Santo Domingo, Arturo Prat, Marquina, Blanca, and Descubridora.

The silver mines in the mineral section of Huantayaja, Province of Tarapaca, are: San Agustin, San Pedro y San Pablo, Discubradora, San Juan, Hilguera, Maria, San Bartalo, Pique del Llano, Colorado, Alliance, and Fortuna. The depth of workings of these mines varies from 200 to 1,300 feet, though there is a shaft in the San Agustin mine to a depth of 2,000 feet. The last 700 feet is through solid rock.

The annual production for the last ten years is stated at about $400,000. During the seven years preceding 1892 it is estimated that $15,000,000 worth of silver was taken from this district. The total amount that has been taken from this group of mines is said to be $22,000,000.

The general character of the ores is chlorides. The formation of the rock is porphyritic and calcareous. The very rich ores and white silver (about 95 per cent pure) are usually found in "pockets" near the contact of the calcareous porphyritic rocks.

In the mineral section of Santa Rosa, a short distance from the above-mentioned mines, are the following silver mines: Pique Gallo, Consequencia, Paniso, El Grande, and others of less importance. These mines range in depth from 200 to 900 feet. During the last ten years the Paniso mine has produced about $1,600,000.

The production of silver in Chile from the year 1844 to 1905, inclusive, was as follows:

	Grams.		Grams.
1844	32,313,411	1875	149,032,653
1845	40,748,763	1876	109,467,025
1846	42,295,321	1877	124,496,914
1847	42,718,290	1878	104,313,567
1848	52,873,495	1879	138,514,485
1849	75,255,023	1880	151,789,186
1850	95,839,820	1881	116,613,904
1851	100,028,217	1882	156,467,212
1852	145,620,268	1883	128,782,496
1853	116,117,990	1884	133,317,195
1854	168,861,026	1885	151,108,532
1855	212,996,186	1886	157,622,641
1856	140,041,462	1887	220,183,161
1857	92,746,037	1888	179,910,775
1858	83,197,256	1889	169,811,061
1859	75,391,290	1890	157,868,736
1860	101,545,938	1891	129,504,449
1861	90,595,763	1892	159,704,521
1862	118,009,673	1893	150,190,454
1863	105,295,007	1894	144,750,163
1864	85,299,823	1895	136,877,259
1865	78,487,615	1896	150,480,381
1866	77,842,170	1897	140,731,734
1867	115,246,740	1898	131,995,202
1868	122,686,136	1899	129,502,835
1869	124,493,799	1900	73,071,337
1870	114,255,019	1901	70,237,272
1871	121,949,909	1902	57,417,600
1872	117,656,203	1903	28,552,366
1873	109,688,663	1904	28,500,503
1874	142,576,960	1905	16,314,698

Gold.

Mr. Ch. Vattier in his pamphlet called "Notes on Mining and Metallurgy in Chile," prepared for the Pan-American Exposition, held in Buffalo, N. Y., in 1901, gives the data used in the compilation of the several minerals and the mining methods hereunder described, while the statistical data are taken from Estadistica Minera de Chile en 1904.

The Imperial, Valdivia and Osorno gold mines, as well as those of Quillota, Choapa, Coquimbo and Copiapó, yielded considerable quantities of this metal in ancient times. It is recorded by Baron von Humboldt that during the 18th century about 1,100,000 marks, or 16,340,000 ounces of gold were produced in Chile, which at £4 per ounce would amount to £65,360,000. Although in the 19th century there was a great falling off in auriferous workings, for reasons too lengthy to explain here, there still exist some important placers (Llampaico, Catapilco), and such mines as the San Cristobal in Antofagasta, the famous Guanaco mine, near Taltal, El Inca and Cachicayo in Atacama, the Capote, Pastos Largos and Canutillo in Coquimbo, the Alta Gracia, Espino, Andacollo and Punitaqui in Illapel, the Vacas, Casuto and Chamuscada in Petorca, Santiago, Tiltil, etc.

Aside from the concentration of gold in copper matte, or copper and silver matte, obtained by smelting ores in which gold exists only in very small quantities, the metallurgy of gold is generally confined to simple amalgamation, in more or less primitive form. A few establishments, such as Alhue, near Melipilla, and those of Guanaco, near Taltal, have introduced some improvements in their processes. The use of cyanide of potassium has not given good results so far, either on account of the composition of the ores or the lack of technical knowledge in applying the same.

There is only one district of importance which produces gold.

San Cristobal.—This district lies 42 miles southeast of the station Cuevitas, on the Antofagasta Railway, which is itself 50 miles from the port. There is a good cart road to Cuevitas. Freight to the port is $8 per ton for carting and $4.10 for railway freight, or $3 gold in all. The mines were discovered in 1882, and have been worked ever since slowly and with great difficulty owing to the lack of water. This has to be taken up from the railway and costs about $4 gold a ton. The country rock is rhyolite, and the lodes are quartz. The gold is found in its native state, with little or no pyrites, but there is a good deal of carbonate of lead and silicates of copper. The principal mines are the Bolaco, Palmira, Pobre Diablo, Bolaquito, etc. The deepest is the first named—300 feet. The Palmira has a tunnel 600 feet in length along a 3-foot lode, which averages 1 ounce to the ton. The Bolaco has given very rich ore in a vein of 2 to 3-inch thickness, which accompanies the lode. The production, which for a long time was between 500 and 700 ounces per month, is now only about 100 ounces.

LAJA FALLS, CHILE.

The wonderful Falls of Laja, known as the Niagara of Chile, which have a drop of 106 feet, occur in the river of the same name, an affluent of the Bio-Bio. Its source is in Lake Laja, near the Antuco Volcano.

With a water supply this district would have a large production.

In the Territory of Magellan there are a number of smaller claims, which are worked on a small scale and for which reliable statistics are not available. They are situated principally in the large island of Tierra del Fuego and upon smaller islands in the vicinity of Cape Horn; also on the Patagonian coast line between Cape Dungeness and the Gallegos River.

The soils where the claims are situated are, generally speaking, alluvial, and the method employed in working the mines is very simple, consisting of primitive washing apparatus. The depth where the yellow metal is found is from 10 to 15 feet below the surface.

Owing to the manner in which the gold is mined it is practically impossible to collect exact statistics as to the output. It is estimated that the production of gold in this territory for the year 1901 was 100 kilograms (220.4 pounds), and the number of men engaged in gold mining approximately 500.

Gold is not taken from quartz in this district. At various times attempts have been made to produce gold by more elaborate methods than those now in vogue, but they have all ended in failure. Gold mining in this section seems only to pay in a small way and is engaged in by the poor working classes—Austrians, Italians, and Chileans—who are willing to lead a lonely, rough life in a climate that is exceptionally severe. The average amount earned per month by those engaged in mining in this section of Chile would not exceed $50 in United States currency.

The production of gold in Chile from the year 1851 to 1905, inclusive, is given by official statistics as follows, 5 year periods having been adopted from the year 1851 to 1895, from which time on the yearly production is given:

	Grams.		Grams.
1851-1855	3,000,000	1897	1,538,315
1856-1860	3,500,000	1898	2,037,207
1861-1865	2,200,000	1899	2,059,641
1866-1870	2,000,000	1900	1,974,637
1871-1875	1,500,000	1901	1,100,292
1876-1880	1,200,000	1902	1,285,514
1881-1885	1,500,000	1903	994,498
1886-1890	6,500,000	1904	1,134,907
1891-1895	7,050,000	1905	1,055,379
1896	1,634,076		

Iodine.

Iodine is found in combination with nitrate, in all of the nitrate deposits, in the form of salts having soda as a base. The percentage or richness varies greatly, fluctuating generally from three-tenths of 1 per cent to one one-hundredth of 1 per cent. The salts of iodine are dissolved in water together with the nitrate, and are afterwards extracted from the strongly impregnated solution remaining after the crystallization of the nitrate by a cheap and simple process, the iodine being precipitated in the metallic state and, therefore, perfectly pure. It is put upon the market in this form.

The small consumption of this product in the industries has compelled the producers throughout the world to combine or agree to restrict its production in proportion to its consumption. This agreement binds all the nitrate producers of the country to extract but a very small proportion of the iodine contained in the nitrate lands, throwing the solutions containing it away with the waste or refuse resulting from the refining of the nitrate. This waste will probably be used for the purpose of extracting such valuable substance which will thus be utilized as well as the nitrate residue in which it is found.

The production of iodine in 1901 was 4,206 Spanish quintals, and the exports from all the ports of the Republic aggregated 6,563 Spanish quintals, or a quantity approximately equal to the exports of previous years. The price of this substance was, in 1901, 5½ pence per ounce Troy.

The iodine exports from Chile from 1879 to 1902 consisted of 6,117,237 kilograms of iodine, from the following districts:

	Kilos.	Per cent.
Tarapacá	5,014,765	81.9776
Tocopilla	503,813	8.2360
Antofagasta	359,670	5.8796
Taltal	238,989	3.9068
Total	6,117,237	.....

In the year 1903 the iodine exports were 387,276 kilograms, while in 1904 and 1905 they reached 461,484 and 564,230 kilograms, respectively.

Borate.

Up to the present time the manufacture of pure borax in Chile has only been experimental and the production has been small. The exports of borate of lime and borax are given in the official statistics under one heading, and the exports from 1874 to 1902, inclusive, are shown in the following table:

	Kilos.
1874 to 1883	12,595,492
1884 to 1885	33,956,453
1896 to 1902	82,982,143
Total	129,534,089

In addition to the foregoing there have been exported through the port of Arica, proceeding from the borate deposits of Chilcaya, 3,909,432 kilograms, making the total exports of this article amount to 133,443,520 kilograms.

During the year 1903 there have been 16,787,913 kilograms of borates exported, and in 1904 and 1905 the exports were 1,673,300 and 19,612,400 kilograms respectively.

Common Salt.

To the east of the ports of Punta de Lobos and Huanillos there is a great salt desert extending over an area of 32,000 hectares, covered with common salt or sodium chloride. Over this large tract common salt is found almost chemically pure and in crystallized form. The analyses made from the wells or shafts under operation gave 99.99 per cent of sodium chloride. The thickness of the stratum of common salt is not definitely known. The deepest shaft sunk to a depth of 25 meters (82 feet) and have not reached the rock or stratum upon which this great deposit rests.

At the present time (1902) that portion of the great salt desert nearest to Punta de Lobos, which is only 18 kilometers distant from the sea, is being worked. In 1901 salt to the amount of 220,000 Spanish quintals was extracted, all of this output being shipped into the interior of the Republic for domestic consumption.

The excellent quality of the salt mined permits it to be employed in all classes of industries, and it may even be used advantageously for domestic purposes. A single track road was built in 1902, to foster the development of the salt mining industry, which is of very recent date. Besides the large deposits mentioned several other smaller and less important are found within the Chilean territory.

In the four years, 1899 to 1902, after the importation of foreign salt had ceased, 300,000 metric quintals annually were furnished from the following salt mines:

	Metric quintals.
Arica salt mines	26,027
Rock salt from Huanillos and Punta de Lobos	82,504
Antofagasta salt deposits	32,378
Domestic consumption at Tarapaca and Antofagasta	12,362
From salt deposits of Tarapaca, Antofagasta and Atacama by the amalgamation and lixiviation process	52,188
Salt mines of the center	94,541
Total	300,000

The following table shows the production of common salt in Chile from 1903 to 1905, inclusive:

1903	16,263,500 kilograms.
1904	17,673,995 kilograms.
1905	12,107,747 kilograms.

Of this total the largest percentage came from the so called Salar Grande or Huanillos mines mentioned above, the quantity mined being 10,444,231 and 6,044,450 kilograms for 1904 and 1905 respectively.

The production of salt has increased so rapidly that Chile is now able to export salt, where but a few years ago it had to import nearly all its requirement. In the year 1904 the exports of salt amounted to 31,950 kilograms and in 1905 to 107,080 kilograms.

Cobalt.

According to a report of the British Consul General at Valparaiso* on the cobalt mines of the Province of Atacama, the following particulars are worthy of notice:

In the Department of Freirina, in the San Juan group, situated to the northeast of the port of Peña Blanca, there are very extensive well-formed lodes, and varying in width from 1 to 6½ feet. Two of the old workings have been sunk to a depth of 70 meters (77 yards), but those now in working have not gone deeper than 40 meters, the ores at that depth containing oxide of cobalt, arseniate, and sulfo-arsenide of cobalt. There are also lodes with cobalt and copper separately as well as in combination.

The average ley for cobalt is 4 per cent. The group may be considered as virgin, and is easy to work.

The Petaca group is situated 25 miles to the south of the town of Vallenar. This group is also extensive, with well-formed lodes varying in width from 1 to 5 feet. None of the mines has reached a greater depth than 10 meters (10.9 yards).

The Caminada group is situated about 12 miles to the northwest of Vallenar. The mines have been sunk to a depth of about 50 meters (54.7 yards), the lode being about 20 inches wide, and containing oxide, arseniate, and sulfo-arsenide of cobalt.

In the Department of Vallenar the groups are of small importance.

In the Department of Copiapo there are four groups of cobalt mines, but with the exception of the Cobriza mine, in the Sacramento group, they have hardly been worked. The Sacramento group is situated 5 miles from the station of Molle, 38 miles from Copiapo. The principal mine, the Cobriza, has been sunk to a depth of 60 meters (65.6 yards), but is now partly filled up with water and débris. For a year past work has been in progress clearing up the mine, and during that time about 100 tons of cobalt ores have been taken out, giving an average ley of 4 per cent. The lodes are Royal, with an average width of 33 inches.

The Matecitos and Cerro de los Carros group is situated close to the station of Loros, 40 miles from Copiapo. The mines are old and are not now being worked.

The Petacas group is situated 12 miles from the station of Nantoco, 15 miles from Copiapo. The principal mine is the Olga. The mines have as yet only been worked superficially. The lodes are of great length, averaging 3 feet 4 inches in width, and a ley of between 1 and 2 per cent.

The Pabellon group, situated 23 miles from Copiapo, is composed of two old mines not now being worked.

The production of cobalt from 1844 to 1902, inclusive, amounted to 5,941,384 kilograms; in 1903 to 289,990 kilograms, and in 1904 and 1905 to 125,000 and 28,589 kilograms respectively. All of the cobalt

*Board of Trade Journal, January 22, 1903.

produced in Chile is exported. The considerable reduction in the production of 1905 as against 1904 and that of 1904 as against 1903 is explained partially by the instability of the foreign markets during the year 1904 and partially by the fact that the largest cobalt mine in Chile, that of the Department of Freirina, was flooded and therefore unable to produce the usual amount. This mine has, however, been rehabilitated and is expected to soon reach its former maximum output.

Manganese Ores.

In certain parts of Chile there are valuable deposits of manganese ores, the exploitation of which date from 1884, when the iron and steel industry of the country required manganese ores containing phosphorus and silica. With the exception of a small quantity exported from the ports of Caldera, Antofagasta and Iquique, the principal exports are made from the ports of Coquimbo, Carrizal Bajo, and Valparaiso. From 1884 to 1902 the exports were as follows:

Port.	Quantity. *Kilos.*	Port.	Quantity. *Kilos.*
Coquimbo	297,663,709	Antofagasta	65,439
Carrizal Bajo	227,363,596	Iquique	13,805
Valparaiso	18,962,927		
Caldera	475,835	Total	544,545,311

The countries taking these exports were as follows:

Country.	Quantity. *Kilos.*	Country.	Quantity. *Kilos.*
England	453,318,473	Germany	245,500
United States	89,305,038		
France	1,676,300	Total	544,545,311

The production of manganese ore, which is identical with the exportation thereof, from 1903-1905, inclusive, was as follows:

1903	17,110,000 kilograms.
1904	2,323,588 kilograms.
1905	1,323,400 kilograms.

The considerable reduction in the output and export of manganese ore during the last two years mentioned, is due, according to the official publication of the Sociedad Nacional de Minería, to the low prices prevailing in European markets and the difficulty of obtaining cheap freights, which renders the marketing of this product unprofitable.*

*Estadistica Minera de Chile en 1904 i 1905.

Sulphur.

The following table shows the production of sulphur from 1887 to 1905, inclusive:

	Kilograms.		Kilograms.
1887	200	1897	663,650
1888	22,200	1898	1,255,857
1889	155,700	1899	989,220
1890	316,730	1900	2,471,890
1891	480,961	1901	2,515,800
1892	647,101	1902	2,635,520
1893	1,141,778	1903	3,560,222
1894	831,991	1904	3,594,906
1895	931,372	1905	3,470,380
1896	940,039		

Sulphuric acid was first produced in 1903, when the production was 1,600,000 kilograms, while in the year 1904 it was 1,730,000, and in the year 1905 only 1,491,000 kilograms.

Coal.

The existence of coal in Chile has been known since the conquest, but it was not until the year 1840 that coal was mined on a large scale. The largest coal fields are in southern Chile, in the Province of Concepción, Arauco, also Valdivia and the Territory of Magallanes. The Chilean article is bituminous and well adapted for ocean steamers, railroads and also for the manufacture of gas.

Anthracite has been produced to a certain extent at Ternera, in Copiapó, where a seam measuring about 40 centimeters in depth has been surveyed and exploited. But while the coal is well adapted for domestic use, the high cost of mining would not admit of its successful competition with other coals, and consequently mining has been abandoned.

There are other coal deposits which have yielded a lignite of good quality. Indications of this kind of coal are found all along the coast. In Cartajena, Department of Melipilla, exploitations of little importance have been made. Other deposits of this same kind of coal occur in the proximity of Llico, Province of Curicó, in Constitución, Department of Talca; in Cobquecura, Province of Maule, and in the plains of Itata, near the northern border of the Province of Concepción. The basis of native production may be said to be found in the following deposits: Dichato, in the Department of Coelemu, where surveys have been made with some success; Lirquen, for the exploitation of whose deposits a company is being formed; Cerro Verde now in operation; Santa Ana, situated betwen Penco and Concepción; Boca de Maule, Puchoco, Playa Negra and Buen Retiro, in the plains of Coronel, in the Department of Lautaro, this group of mines, with Lota and Colcura, in the same department, furnishing the largest output; Carampangue, Moquegua, Colico and Curanilahue, in the Department of Arauco, also in actual operation, and finally, the mines in the Department of Lebu, situated to the east of the town of that name.

In the north this line runs parallel with the coast, while in the west it touches the points or peninsulas which form the Bay of Talcahuano, and, in the south, it skirts the Bay of Arauco and terminates on the Island of Mocha, the geological formation of which is the same as that of the carboniferous region, although no coal has been discovered. In all these points the strata invariably dips to the west, that is to say, it runs towards the sea, following the rise and fall of the hill chains.

Further south, in the Province of Valdivia, in Llanquihue, Chiloé, and in the Magallanes Territory, carboniferous deposits are also found, but so far they have not been surveyed. Coal has also been found in

ELECTRIC TRAIN ON THE "CARLOS ALBERTO" MINE.

In the coal mines at Lota, which are very largely worked under the Pacific Ocean, electricity is used throughout both for lighting and traction. The picture shows an electric train just emerging from a submarine tunnel over a mile in length.

the Andes mountains in the Province of Colchagua, the coal basin extending from San Fernando into the interior. Coal is also found in Longuimay, which is, however, entirely different from the lignite of the coast.

Surveys made in Angol, Traiguen and near Carahue have shown the existence of coal belonging to that same carboniferous formation, except towards the east of the coast range. Coal deposits are said to have been discovered somewhat to the north, but still in the Central Valley in Nacimiento. The region of the Central Valley, between

Nacimiento and Cartajena, which is the northern limit of the surveyed coal zone, is little known, but it is supposed that this region embraces many coal beds.

The larger portion of the coal fields of the coast extends from Lirquen and Dichato on the north to Lebu on the south. These coal beds outcrop closely to the coast, so that the majority of the coal lands are beneath the sea, with the exception of the mines on the large peninsula forming the Bay of Arauco. This peninsula also contains a large carboniferous vein. The dip of the average coal-bearing formation of this area varies only from 12 to 14 degrees towards the west.

The coal deposits of Chile are considered as belonging to the lower tertiary period and rest directly on the mica schist which has a thickness of 240 meters. As only the coal fields of the seaboard have been surveyed, there is a possibility of discovering other coal measures of even more ancient formation beneath this tertiary strata. The finding of these lower coal deposits which may possibly contain a mineral of good quality, would be of immense importance. The formation is made up of numerous strata, sandstone alternating with mica and mica clay, the composition, firmness and color of which vary. These strata contain 10 veins from 0.05 to 1.40 meters in thickness each. However, only 3 can be considered as beds of sufficient thickness to be worked, viz: The first, at a depth of 200 meters, is 1.20 meters thick; the second, situated at 34 meters in a vertical plane below the former, is 1 meter thick, and the third and principal vein lies 9 meters below the latter, and has a thickness of 1.40 meters.

The great regularity of the formation and its length of 440 meters might lead to suppose that a coal basin of enormous extent lies beneath the sea and indicates the possibility of also finding coal in abundance in the region to the east of the coast range.

The production of coal from the year 1840, at which time the exploitation was commenced on a large scale, to the year 1902, inclusive, amounted to 20,650,000 tons, in 1903 the total production amounted to 827,112 tons, in 1904 to 835,142 tons, and in 1905 to 882,141 tons.

Of this quantity 225,000 tons were sold to the transatlantic liners touching at Chilean ports, 2,800 tons were exported to the neighboring republics and the balance was consumed in the Republic.

It is a curious fact that in spite of the extensive coal fields which exist in Chile, and in spite of the fact that a large quantity of the coal mined is sold to foreign vessels, Chile is a large importer of coal, and imports more coal than it produces from its own mines, the imports in the year 1905 having been 1,179,058 tons.

This is explained by the fact that British and other steamers carrying nitrate of soda to Europe bring coal with them as back-freight to the nitrate ports and can afford to carry this coal very cheaply and thus successfully compete with the native coal; aside from the fact that Chilean coal is not suitable for all purposes, it being lignite and lacking somewhat in caloric qualities.

Other Mineral Substances.

Mr. Vattier is authority for the following data on the mineral wealth of Chile:

Mercury ores are worked at Andacallo and Punitaqui, where small quantities of this metal are now produced.

Cobalt and nickel mines are worked at present in the Province of Coquimbo and in the Department of Vallenar, but they are not sufficiently developed, and consequently their production of ores is insignificant. Production of cobalt ores for 1900, 26,844 kilograms (59,200 lbs.). Production of nickel ores, 725 kilograms (1,600 lbs.).

Lead ores are worked only in silver smelting. Zinc is found in the form of blende and zinc carbonate (smithsonite). These ores are sometimes worked for their silver contents, but zinc is not produced from them in Chile. Graphite has been found in Chehueque, Vallenar. Sulphur is abundant in its natural state in many districts of the Cordillera, such as Iquique, Ascotan (Antofagasta), Taltal, Baños del Toro (Elqui), Maricunga, etc. The cost of refining and high freights have restricted its production, and European sulphur is still imported in large quantities.

Pyrites, generally copper-bearing, offer the elements necessary for the manufacture of sulphuric acid, and it can be said that the day is not far off when these pyrites will be a source of good profit, especially with such large and rich mines as Reten, near Quile (Coquimbo). Sulphate of lime is beginning to be worked on a large scale, as its use is growing daily. At Tiltil, Catapilco, San José, etc., a pure gypsum is worked, and sold as fertilizer at $5.00 per ton. There are gypsum deposits in Vallenar which yield a fine gypsum, used for industrial purposes and interior decoration of buildings. These deposits are situated near Ventanas, about 38 kilometers north of the town of Vallenar, in the Jurassic formation. They are worked in the form of a quarry, at a cost of $2.00 per ton, a large cutting, 60 meters long and about 4 meters deep, having been made. Transportation by cart to Vallenar is worth $4.00, and $2.00 from Vallenar to Huasco (sea-port), where the gypsum is shipped for Valparaiso.

In the same department of Vallenar near Camarones del Rio some marble deposits are being worked. The marble, generally of a greyish color, takes a fine finish when polished. Calcium borate is found in large quantities and of fine quality, in the northern part of the country. Some of the principal deposits are: Ascotan and Carcote in Antofagasta, near the railroad from Antofagasta to Bolivia; Maricunga, northeast from Puquies, in Copiapó; Atacama, Pedernales and Infieles, east of Pueblo Hundido, in Chañaral department. The borate deposits of Ascotan and Carcote were worked successfully for a long time by a Chilean company and were sold a few years ago to a German syndicate which afterwards transferred them to a corporation of California. The deposits in Maricunga are situated about 110 kilo-

meters from the Puquios railroad station. These deposits are estimated to contain about 95 million tons of lime borates of about 26 per cent boric acid, which by simple drying may be concentrated to 35 per cent. and this could be purified on the premises. Besides borates there are also found in Maricunga, high grade nitrates, pure salt in abundance, pure sulphur and alum. The borax deposits of Perdernales, which are very extensive and easily worked all the year round, have been surveyed and favorably reported on, and will undoubtedly be of importance as soon as transportation facilities are established.

Other mineral substances found in Chile are rock and sea salt, potassium and sodium salts, alum, sulphate of iron, kaolin, ochre, etc.

Mining Laws.

The "Codigo de Minería Nacional" of Chile comprises all the mining laws and is a very extensive and complete work, covering every phase of the mining industry. The present mining law was enacted by Congress on the 22d of December, 1888, and has been in force ever since. The salient features of the Chilean mining laws are the following:

1. For the purposes of the law the mineral substances of Chile are divided into six classes, viz.: 1. Substances which are free and belong, under certain restrictions, to the parties finding or first discovering them. These include Gold, Silver, Copper, Platinum, Mercury, Lead, Zinc, Bismuth, Cobalt, Nickel, Tin, Antimony, Arsenic, Iron, Chrome, Manganese, Molibdinum, Vanadium, Rodium, Iridium, Wolfram, and precious stones. The discoverer is entitled to a certain share of the profits these mines may yield, even if they are found on private property. He is likewise entitled to exploit all of these and all other fossil substances which he might find on lands belonging to the Federal or Municipal Governments, being, however, obliged to report his find to the Government and pay the corresponding taxes, etc., thereon.

2. Substances which belong to the owner of the soil. These include coal and other fossil substances not included in class one.

3. Substances which are exclusively exploited by the State. These include the guano deposits, as well as all nitrate and analogous salt deposits which may be found in lands belonging to the Federal or Municipal Governments. All guano deposits, whether found on private or Government lands, are Government property.

4. Auriferous sands, tin-bearing sands, and any other mineral products found in rivers and placers are free and may be exploited by anyone, no matter who the owner of the lands on which they are found may be. A mining claim must, however, be obtained from the Government, in accordance with the law governing these claims.

The refuse, slag or washings from abandoned mines, as well as all mining establishments which have been abandoned by their owners, may be exploited by anyone, provided these properties have not been fenced in or otherwise closed up.

5. Salt deposits on the seacoast or in lakes or lagoons belong to the adjoining owner or owners, their respective boundaries being for this purpose extended in an imaginary line to the seacoast or into the lake or lagoon.

6. Precious stones or metals found isolated on the ground, and belonging apparently to no particular mine or vein, are declared to be "res nullius," that is, they belong to anyone who may find them.

The mining laws further provide that the miner shall be allowed a certain extension of territory, which is fixed by the Government, and which is termed "pertenencia." These "pertenencias" may be for exploitation or exploration and usually consist of one hectarea and may consist of 5 hectareas and pay a tax, which is fixed by the Government in accordance with the extent and value of the metals found.

The owner or discoverer of a mine is also entitled to the lands requisite for the proper working of the mine, and the owner of such lands must accept the price stipulated by the Government appraisers.

Mines may be acquired by either natives or foreigners, there being no distinction made in favor of the natives, the foreigner being entitled to the same privileges and subject to the same rules.

PROSPECTING. The law grants the right to survey or prospect for minerals wherever they may be found or suspected, provided, however, that the lands are not devoted to agriculture or that they are not within an enclosure. In the case of lands devoted to agriculture the permission of the owner or manager of the property must be obtained, and should he refuse such permission, the Judge of the District may be appealed to, who will either grant or refuse the permit, according to the circumstances of the case.

According to the "Estadistica Minera de Chile en 1904-1905," published by the National Society of Mining, there were 7,051 copper mines in Chile, with an area of 23.020,74 hectares (1 hectare equal to 2.471 acres), while there were 3,487 gold mines with an area of 15,663 hectares and 1,091 silver mines covering 3,946 hectares. There were some 300 mines of gold, silver and copper and iron and copper, 90 mines of manganese, 54 of iron, 32 mica and 19 cobalt mines. There were 875 deposits of nitrate of soda with an area of 41,787 hectares and 835 borax deposits with 61,652 hectares, the borax deposits covering by far the largest area. The sulphur mines numbered 286, covering 11,748 hectares, gypsum 21, aluminum 11 and mercury 4. There were 83 coal mines with an area of 5,000 hectars, 24 petroleum deposits and 55 stone quarries.

The total number of mines in Chile on January 1, 1906, are given as 15,517, extending over an area of nearly 200,000 hectares (about 500,000 acres).

VIEW OF THE PORT OF CORRAL.

Corral is the seaport of Valdivia which is situated about twelve miles inland on the banks of the Valdivia River. It is about 475 miles from Valparaiso by sea, and a port of commercial importance to southern Chile. Corral figures prominently in the early history of the country, having been fortified against settlers from Holland as early as 1645. It was named in honor of a prominent judge of the Spanish Viceroyalty in Lima, Don José de Corral y Calvo, although the place was early known as Cuyamo.

CHAPTER VII.

MANUFACTURING INDUSTRIES, IMMIGRATION AND IMMIGRATION LAWS.

The principal resources of the country, as has been shown in the previous chapters, are derived from mining and agriculture and manufacturing industries are therefore naturally developed along those lines. Up to a few years ago all the energies of the country were bent on the exploitation of the vast mineral resources, and agriculture to a lesser degree, but within the last few years numerous industrial establishments have been established, especially in the Department of Santiago, and are now in a prosperous condition.

This industrial development of Chile is largely due to the efforts of the "Sociedad de Fomento Fabril," a society which was organized in the year 1883 for the purpose of stimulating industrial progress, facilitating immigration into Chile and providing industrial education for the young Chilenos. The Society maintains 17 schools for industrial training, including classes for electricians, gasfitters and plumbers, architects, etc., etc. These schools are located in the principal manufacturing centers, viz: Santiago, Valparaiso, Concepción, Iquique and Valdivia. The Society also publishes a monthly bulletin, called "Boletin de la Sociedad de Fomento Fabril," in which the various industrial problems of the country are discussed, and which contains valuable information for those wishing to engage in manufacturing in Chile. It also maintains an industrial museum, in which the raw products of the country are shown, and an exhibit, showing the various articles manufactured in the country, with a description of the process of manufacture.

In the year 1905, according to the latest official statistics available, there were 10,156 industrial establishments of all kinds in the Republic of Chile, being classified as follows: 134 factories of textiles, under which heading are included 56 mattress and 9 feather duster factories, 452 factories using hides and skins, in which are included 137 tanneries; 802 wood working plants, in which are included 479 saw-mills and 127 cooperages; 1,090 factories using metals of different kinds, 839 of which are iron works, 77 copper smelting works, 9 electric apparatus and 6 can factories; 625 crockery, glassware and pottery factories; 326 factories of chemical and pharmaceutical articles; 2,846 factories of foodstuffs of various kinds, including 710 flour mills, 687 bakeries of different sizes, 517 butter and cheese factories; 105 distilleries and 85 breweries; 1,894 factories of wearing apparel;

224 furniture factories; 967 factories of building material; 358 factories of vehicles of all kinds; 19 gas factories; 31 electric light and power plants; 215 printing and lithographing establishments; 82 bookbinderies; 6 factories of musical instruments and numerous other factories of lesser importance.

The department of Santiago may be said to be the principal industrial center of the country, there being 1,051 factories in the department of Santiago, according to the last census, with a total invested capital of 54,476,422 Chilean pesos, and a total annual produc-

CALLE AHUMADA, SANTIAGO.

Between the "Plaza de la Independencia" and the principal avenue, called "Alameda de las Delicias," in the old section of the town, in which are located most of the administrative buildings, as well as the commercial houses of the city.

tion of 86,039,499 pesos. The shoe and leather industry is in a particularly flourishing condition in this department and has increased so rapidly within the last few years that now practically all the cheaper grades of shoes are made in Chile from native tanned leather. The tanning industry, as well as flour milling, are of considerable importance in this department. Valparaiso may be considered the next

important industrial center, there being a number of foundries, wood-working plants and numerous other establishments of various kinds, among which a galvanized iron plant with a daily output of 20 tons per day may be mentioned. A whale oil, linseed oil, a chocolate factory and a smoked and dried meat factory are also located in Valparaiso. The largest sugar refinery in Chile is located six miles from Valparaiso. Other important industrial centers are Valdivia, which may be called the home of the breweries, there being 4 large breweries located in this city. The tanning industry is, however, of considerable importance in this city, as is the meat industry, flour milling and distilling of alcohol. Iquique, at which the largest nitrate works are situated and at which there are also railway shops and other factories; and Antofagasta, which is also important on account of its nitrate works and at which the largest silver smelting plant in Chile is situated. Other silver and copper smelting plants are also situated at Coquimbo and Caldera, as well as at Coronel and Lota, while at Concepción, Chillan and Puerto Montt there are a number of tanneries, flour mills, as well as foundries, breweries, distilleries and other industrial establishments.

Most of the raw material used by the various industries are derived from Chilean soil, but in some instances raw material is also successfully imported and manufactured in Chile and the finished product is either sold in the country, or very often exported to the neighboring Republics. The sugar industry furnishes a good illustration of this fact, for while beet sugar can be, and is to a certain extent, grown in Chile, the production is not sufficient to provide the necessary raw product for the refineries established in the country, and thus a considerable quantity of brown sugar is imported annually from Perú to be refined in the country. The surplus of the refined product, which may not be consumed in the country, is again exported. The cotton goods industry is likewise dependent on the importation of its raw material, most of the raw cotton coming from Perú. Notwithstanding this apparent drawback the cotton goods industry has developed rapidly and there are now 13 cotton mills in Chile, the majority of which are situated in Santiago, and the largest of which is the plant of the Chilean Mills Company, Limited, a British company, situated at Chiguyanti, in the Province of Concepción. This company was organized in 1901, operating under a franchise granted by the Chilean Government, and has a well-established, thoroughly modern and up-to-date plant. It consists of bleaching and dyeing works and a factory with 60 looms. Its capacity is estimated at 1,500,000 yards per annum.

The pottery and glass works industry is also partially dependent on the imports of raw materials and likewise the mirror and looking glass industry, all of the plate glass for the latter being imported.

Breweries partially import their raw materials and partially they use hops grown in the country. The imports of this article are, how-

ever, annually reduced as the acreage devoted to the growing of hops in the country increases. Chilean beer is noted for its excellent quality and is said to compare favorably with some of the best beers brewed in Germany and Austria.

Paper factories are likewise more or less dependent on the importation of their wood pulp for the manufacture of papers, although there is abundant material in the country which might be used successfully as paper pulp. It is estimated that the Chilean forests contain some 2,000,000 acres of timber suitable for the production of wood pulp.

On the other hand, a vast amount of raw material is shipped abroad, some of which could be successfully used in manufacturing in the country and the Chilean Government, as well as the Sociedad Nacional de Fomento Fabril are endeavoring to develop these industries. Thus the metal industry has made considerable progress during the last twenty-five years and it now embraces almost every class of work, such as the manufacture of ornamental statues, etc., down to the manufacture of nails, etc.

Likewise the woodworking industry has been given considerable attention and has developed considerably, and furniture of all kinds, as well as carriage wheels and other vehicles, barrels, etc., are now all being manufactured in the country.

The tanning and shoe and leather industry is one of the oldest industries in the country and has reached a considerable degree of development. Aside from the shoes of inferior grade, trunks and valises, as well as saddles and harness of all kinds, and numerous other articles of leather are now made in Chile.

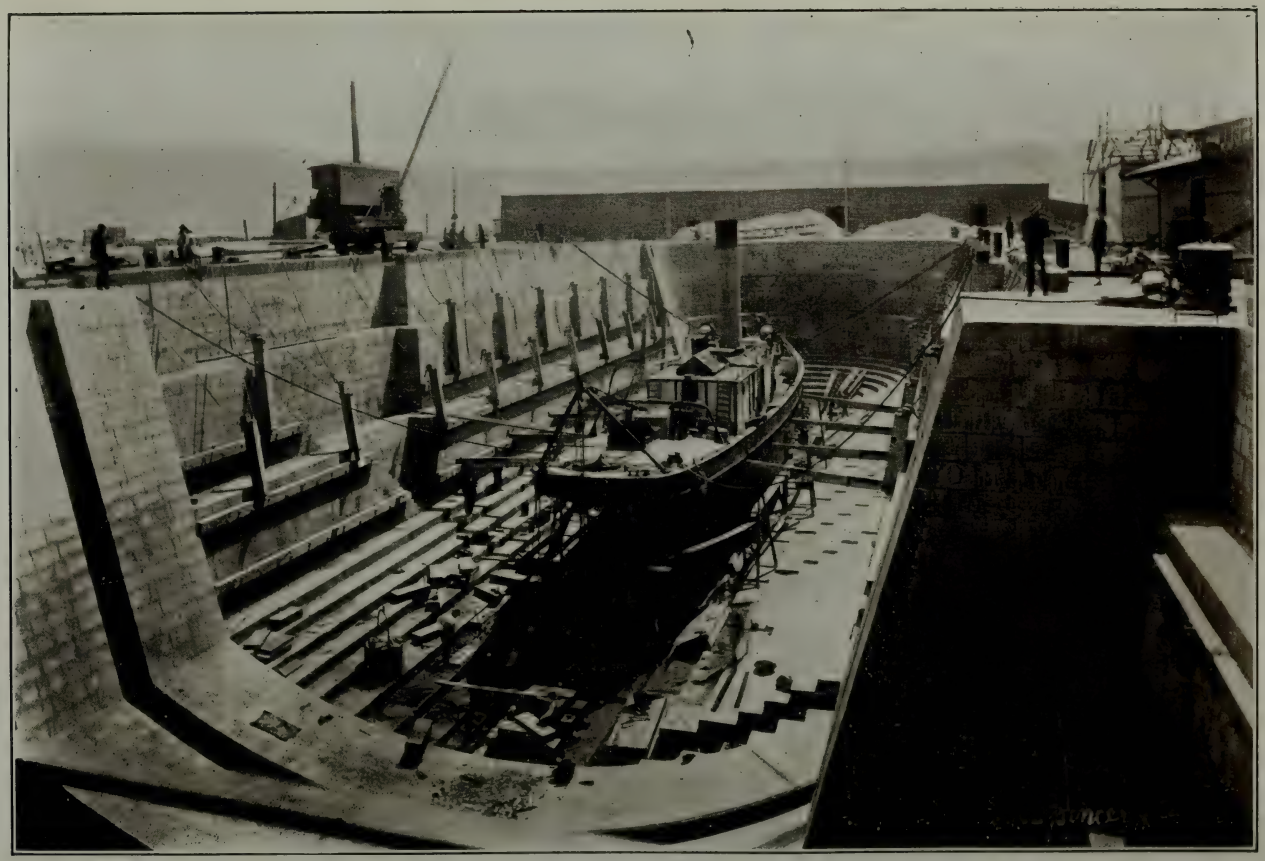
The Sociedad de Fomento Fabril of Chile has published, in various numbers of their monthly bulletin, a résumé of the industrial establishments in the various Provinces and Departments. A synopsis of these publications will give a general idea of the importance of manufacturing in the various districts, as shown by these statistics:

The department of Santiago has been mentioned above.

In the Department of Victoria, Province of Santiago, there were only 18 industrial establishments with a capital of $2,991,100 and employing 716 hands, while in the Department of Melipilla, Province of Santiago, there were 17 factories with a capital of $1,618,250, employing 138 hands.

The statistics for the Province of O'Higgins show 64 industrial establishments in the various Departments of the Province, the majority of which are, however, located in the Department of Rancagua. The total capital invested amounts to $6,875,786, with a total annual production of $15,071,050, employing 904 hands.

The Province of Colchagua has 75 factories of different kinds, with a total amount of $2,273,784 invested and an annual production of $4,763,322. They employ 553 hands.



SECTION OF THE DRY DOCKS, TALCAHUANO, CHILE.

The large dry docks at the flourishing maritime port of Talcahuano were constructed under the direction of the Federal Government at a cost of about $6,200,000 gold. They are located a short distance from the great coal-mining district of Concepción. Talcahuano is the naval station of the Republic.

Curicó shows 58 factories with a total capital of $3,024,783 and an annual production of $5,000,878, employing 540 laborers.

In the Province of Talca there were 156 industrial establishments, nearly all of which were located in the Department of Talca. The total amount of capital invested was $9,227,945 and the annual production amounted to $16,314,579, employing 2,857 hands. The most important industries in this Province are tanning and flour milling.

The capital invested in 107 establishments in the Province of Linares is $5,405,000, employing 1,281 hands. Most of these establishments are situated in the Departments of Parral and Loncomilla. The most important industry in the former department is the beet sugar industry, the Chilean Beet-Sugar Company having one of the largest sugar refineries in the country. This company has a capital of $2,500,000 pesos and an annual productive capacity of $4,000,000. It employs over 600 hands.

The Province of Maule shows 89 factories, the majority of which are located in the Departments of Itata and Constitución. Their capital is estimated at $1,876,700 pesos and their annual production at $4,068,000, employing 1,460 factory hands. The most important industry of this Province is the ship-building and repairing, there being 33 ship-yards, which build small lighters and launches.

Ñuble shows 158 industrial establishments with a capital of $7,950,000 and an annual production estimated at $12,618,936, employing 2,244 hands. The majority of these establishments are located in the Department of Chillan, which Department is one of the important industrial centers of the country.

In the Province of Concepción there were 365 factories with a total capital of $37,385,786 and an annual production of $51,197,630, employing 6,582 factory hands. Of these there were 61 tanneries, 57 factories of wearing apparel and 56 of foodstuffs.

The Chilean Government protects the existing industries by means of a protective tariff and tries to foster and encourage new industries by extending certain privileges, such as the free introduction of machinery, raw products, etc., and to foster some industries even grants certain bounties and premiums, thus fishing and the canning of fish of all kinds is encouraged by the payment of certain premiums, which are fixed according to the tonnage of the vessel and the amount of fish that has been caught during the year.

The principal drawback to the rapid development of the manufacturing industries in Chile is, however, the lack of labor, inasmuch as the laborers find ready employment in the mines, and the salaries paid them in the mining districts are usually higher than those paid by the various factories. In order to overcome this difficulty the Chilean Government is encouraging immigration as much as possible, even to the extent of paying their passage, provided they will comply with certain requirements of the law, for which purpose the Chilean Government maintains immigration offices in different parts of Europe.

The immigrants are taken care of on their arrival at Valparaiso and suitable employment is provided for them. During the first six months of the year 1907 5,000 immigrants were thus introduced in Chile, which number is, however, as yet insufficient to satisfy the necessities of the mining, agricultural and manufacturing industries.

The Chilean Government will furnish free transportation to anyone signifying his intention to engage in some trade or calling in Chile, provided he presents a certificate of birth of himself and each one of the members of his family, further a certificate certifying to his good health, morals and behaviour and proof of some kind showing that he has previously been engaged in some trade or profession. In the case of his being accepted by one of the official Agencies of the Chilean Government in Europe he will receive not only free passage for himself, but also for all the members of his family, as well as for his baggage, and if he can satisfy the proper authorities that he possesses a special knowledge of certain industries, free transportation for all of his tools and machinery will likewise be granted him. Superintendents or Managers of industrial establishments or foremen of workshops, etc., who can show that they have been employed in that capacity in another country, will receive second class transportation free for themselves and members of their families.

CHAPTER VIII.

COMMERCE, IMPORTS AND EXPORTS. PORTS AND CUSTOM HOUSE DISTRICTS. TARIFF.

The trade of Chile, both foreign and domestic, has increased steadily during the last decade, in accordance with the development of the mining and agricultural industries, and the increase of the necessities and requirements of the inhabitants.

The year 1906, however, marked a decided set-back in the commerce of Chile, due to the earthquake, which partially destroyed the principal harbor of Chile, Valparaiso and other parts of the country. The Chilean Government, however, adopted measures to restore normal conditions as quickly as possible, and the reconstruction of the harbor of Valparaiso, in which the sum of $20,000,000 is to be expended, is now in progress. The commerce of the year 1907 shows a marked improvement over that of 1906, and proves that normal conditions are rapidly being restored and commerce is again advancing by leaps and bounds. Providence itself seems to have shown a desire to overcome the results of the disaster as much as possible, for the year 1906 was one of the most prosperous periods, up to the time of the catastrophe, Chile has ever seen.

Domestic Trade. The domestic trade of the country consists of the interchange of products produced in one section of the country and not produced in sufficient quantities in another section to satisfy the necessities of the population. Owing to the peculiar geographical situation of Chile the domestic trade is very extensive inasmuch as the northern region (the mineral region) does not produce agricultural products, the soil being absolutely sterile, and articles of necessity as well as articles of luxury are therefore either imported or brought from the other Provinces of Chile. The coastwise trade consists partly of articles produced in Chile, and partly of articles imported into one of the ports and reshipped to another port, which are termed "nationalized goods" (articulos nacionalizados). The volume of this trade in 1907 amounted to 171,427,781 Chilean pesos of domestic, and 82,239,850 pesos of nationalized, goods. The principal export port of this trade is Valparaiso and the principal import ports are Iquique and Antofagasta. Foodstuffs of all kinds, as well as beverages, make up the bulk of this trade, while wearing apparel of various classes, pharmaceutical goods, mineral oils, instruments, etc., make up the balance.

Foreign Trade. Comparing the imports and exports of Chile for the year 1907 with each other and with those of 1906 we find that the total imports of Chile reached $107,193,747 in gold, an increase of $24,971,654 over the year 1906, while the exports were $100,176,127 in gold, showing an increase of $732,058 over the preceding year. The balance of trade in the year 1907 was thus slightly against Chile, the

imports having exceeded the exports by some $7,000,000, while in the year 1906 the exports exceeded the imports by $17,000,000, and in the year 1905 the balance of trade was almost $28,000,000 in favor of Chile. The earthquake, which occurred in 1906, is, of course, largely responsible for this state of affairs, as although the exports maintained their equilibrium, the imports increased considerably, owing to the fact that large quantities of building materials, machinery, etc., had to be introduced, as well as other articles which are usually manufactured in the country, and which the national factories were unable to produce for a time.

The imports and exports by countries, according to Chilean statistics, are shown in the following statement:

	Imports.			Exports.		
Country.	1905.	1906.	1907.	1905.	1906.	1907.
United States	$ 6,886,800	$ 8,774,914	$11,360,400	$15,623,821	$17,547,088	$ 7,091,807
Argentina	2,311,753	2,269,073	3,855,565	566,454	759,396	1,002,538
Australia	2,761,832	3,462,030	2,699,044	238,688	.....	.....
Belgium	968,506	2,225,955	3,722,017	1,645,341	1,830,644	1,359,339
Bolivia	21,862	.....	54,010	429,293	315,475	396,654
Brazil	291,832	497,880	593,794	124,850	164,107	163,105
Ecuador	340,581	357,302	263,346	106,514	60,894	104,508
France	5,192,422	5,245,604	5,884,151	8,147,380	6,394,980	5,921,790
Germany	17,370,467	20,304,980	27,123,091	26,701,469	18,867,009	20,373,941
India	930,505	1,689,546	1,455,115	.....	.....	.....
Italy	1,866,324	1,911,847	3,004,619	1,477,499	1,198,609	477,602
Japan	15,235	28,186	57,427	500,526	156,821	182,883
Netherlands	13,035	81,638	86,206	1,151,331	4,573,950	4,220,366
Peru	1,805,080	2,520,886	3,210,282	1,828,522	528,259	1,029,519
Spain	627,515	586,774	988,115	666,454	1,099,568	444,902
United Kingdom	25,959,809	30,893,311	41,428,469	36,982,455	45,144,141	50,978,411
Other countries	1,474,050	1,372,167	1,408,096	610,755	803,128	6,428,762
Total Gold	$68,837,608	$82,222,093	$107,193,747	$96,801,352	$99,444,069	$100,176,127

Of the imports into Chile during 1907 textiles comprised the largest item, amounting in value to nearly $25,000,000. Mineral products came next with a value of more than $21,000,000, followed by machinery worth over $17,000,000; coal, oil, etc., $15,000,000; and vegetable products over $11,000,000. Of the exports during 1907 mineral products comprised nearly nine-tenths of the total.

The following statement shows the imports and exports by principal articles during the past three years:

IMPORTS.

Articles.	1905.	1906.	1907.
Animal products	$ 4,783,443	$ 4,894,993	$ 7,775,387
Arms and ammunition	575,550	567,496	1,236,117
Chemical products	1,172,616	1,433,026	2,147,370
Coal, oil, etc.	11,322,857	10,478,536	15,073,498
Machinery	9,142,027	14,253,212	17,370,658
Mineral products	13,482,095	16,475,379	21,366,137
Paper, etc.	1,334,100	1,937,055	2,553,707
Textiles	18,300,843	19,409,566	24,963,172
Vegetable products	6,739,846	11,453,922	11,747,656
Wines and liquors	738,173	1,050,043	2,345,205
All other articles	1,246,058	268,865	614,840
Total Gold	$68,837,608	$82,222,093	$107,193,747

EXPORTS.

Animal products	$ 3,311,536	$ 3,599,279	$ 5,959,649
Mineral products	80,364,730	92,011,295	88,341,036
Vegetable products	5,192,948	3,269,653	4,859,036
All other articles	7,932,138	563,842	1,016,406
Total Gold	$96,801,352	$99,444,069	$100,176,127

Principal Imports and Countries of Origin.

The leading imports into Chile during the past three years, and the principal countries of origin, are shown in the following table:

Articles, and countries whence imported.	1905.	1906.	1907.
Animal products:			
United States	$ 305,870	$ 466,483	$ 919,142
Argentina	2,237,274	2,016,766	2,809,865
France	550,182	577,785	822,535
Germany	646,846	605,483	997,142
United Kingdom	574,566	552,557	1,071,745
Uruguay	201,984	347,513	393,954
Arms and ammunition:			
United States	38,712	76,743	103,843
Germany	350,957	350,282	614,817
Spain	24,385	22,986	25,268
United Kingdom	134,073	66,796	380,617
Chemical products:			
United States	115,340	193,523	235,801
France	253,625	294,048	426,139
Germany	442,125	521,907	850,059
Italy	58,865	101,362	102,261
United Kingdom	265,210	273,246	484,385
Coal, oils, etc.:			
United States	1,172,874	1,289,869	1,383,235
Australia	2,613,005	1,731,825	2,522,894
Germany	648,368	740,517	1,128,425
Peru	449,279	441,252	908,310
United Kingdom	6,163,537	6,059,228	8,826,542
Machinery:			
United States	1,961,692	2,229,237	3,101,783
Belgium	96,342	417,864	932,785
France	204,299	326,066	395,531
Germany	3,866,989	4,550,063	5,467,176
United Kingdom	2,971,047	6,653,400	7,351,153
Mineral products:			
United States	992,282	883,640	1,455,746
Belgium	687,738	1,400,631	1,935,338
France	719,734	1,087,710	798,969
Germany	4,857,506	6,111,267	7,926,572
Switzerland	347,121	321,976	75,882
United Kingdom	5,798,039	6,501,204	9,006,858
Paper, etc.:			
United States	370,428	370,154	500,366
France	82,599	105,098	139,291
Germany	600,292	1,051,788	1,313,291
United Kingdom	154,053	266,318	332,730
Textiles:			
United States	705,002	552,973	711,074
Belgium	96,976	197,553	419,393
France	2,808,087	2,151,756	2,098,324
Germany	4,826,275	4,551,909	6,515,326
India	775,064	1,384,757	1,166,141
Italy	840,775	954,577	1,439,195
Spain	193,531	171,557	190,184
United Kingdom	8,827,770	9,278,112	12,147,909
Vegetable products:			
United States	1,202,227	2,660,440	2,884,957
Australia	92,271	1,727,502	156,496
Brazil	290,703	492,020	593,244
France	226,406	281,477	414,115
Germany	906,669	1,546,462	1,693,215
Italy	779,368	538,841	859,834
United Kingdom	748,926	814,476	1,098,521
Wines and liquors:			
United States	10,592	15,298	24,300
France	232,122	316,721	641,602
Germany	101,050	147,463	332,637
Spain	59,971	100,234	282,530
United Kingdom	266,885	374,315	558,527

The foreign trade of Chile was as follows in 1906 and 1907, the classifications and arrangement given in the Chilean official publication being retained:

IMPORTS.	1906.	1907.
Animals and animal products:		
Live animals	$2,076,302	$3,006,657
Alimentary products	1,155,626	1,826,350
Industrial products.	1,222,782	1,835,711
Manufactures	476,629	708,093
All other articles..	514,214	398,582
Total	$5,445,553	$7,775,393
Vegetable products:		
Fruits, grain, rice, coffee, tea, etc..	$4,615,388	$2,964,581
Alimentary products, olive oil, sugar, flour, etc.	4,206,140	4,114,786
Articles for industries (cork, gums, rosin, tar, etc.)..	623,675	742,814
Manufactures	316,658	437,770
Wood	1,787,695	2,630,663
Tobacco and manufactures of	163,410	183,157
All other articles..	858,143	673,776
Total	$12,571,109	$11,747,556
Mineral products:		
Precious metals and stones, manufactures, specie, etc.	$2,186,761	$2,358,253
Iron and steel, and their manufactures	10,029,525	12,797,033
Other metals than iron and steel...	1,270,231	1,550,736
Stones and earths..	2,909,858	4,023,015
All other articles..	757,225	637,175
Total	$17,153,600	$21,366,212
Textile materials and manufactures:		
Straw, palm, cane and jute	$2,984,012	$2,654,285
Cotton manufactures	10,046,815	13,262,180
Linen manufactures	275,518	360,910
Woolen goods	4,935,300	6,833,050
Silk manufactures.	1,241,973	1,240,131
All other articles..	748,634	612,617
Total	$2,232,252	$24,963,173

IMPORTS—continued.	1906.	1907.
Industrial oils, combustibles, etc.:		
Oils	$655,954	$869,636
Bitumen	86,683	116,171
Combustibles (coal and petroleum chiefly)	9,338,525	13,327,746
Paints and colors..	441,534	606,197
All other articles..	69,784	153,777
Total	$10,592,480	$15,073,527
Paper and paper manufactures	$1,996,606	$2,553,707
Liquors, mineral waters, etc.	1,456,644	2,345,207
Perfumery, medicines, and chemical products:		
Perfumery	$186,372	$280,620
Medicines and other pharmaceutical products	717,513	871,069
Chemical products.	536,537	842,613
All other articles..	141,809	153,075
Total	$1,582,231	$2,147,377
Machines, instruments, tools and apparatus:		
Scientific, musical, arts, etc.	$1,050,570	$1,049,913
Mining machines and apparatus	4,729,941	3,651,192
Agricultural	1,402,763	1,556,885
Industrial (manufacturing, etc.)	4,333,443	6,730,964
Locomotion (locomotives and rolling stock chiefly).	2,770,984	4,113,160
All other articles..	358,910	367,135
Total	$14,646,611	$17,469,249
Arms, explosives, and munitions	$589,793	$1,236,192
Miscellaneous articles.	492,804	516,284

RÉSUMÉ.

	1906.	1907.
Animals and animal products	$ 5,445.553	$ 7,775,393
Vegetable products	12,571,109	11,747,556
Mineral products	17,153,600	21,366,212
Textile materials and manufactures	20,232,252	24,963,173
Industrial oils and combustibles	10,592,480	15,073,527
Paper and paper manufactures	1,996,606	2,553,707
Liquors, mineral waters, etc.	1,456,644	2,345,207
Perfumery, medicines, and chemical products	1,582,231	2,147,377
Machines, instruments, tools, and apparatus	14,646,611	17,469,249
Arms, explosives, and munitions	589,793	1,236,192
Miscellaneous articles	492,804	516,284
Total imports	$86,759,683	$107,193,877

EXPORTS.

	1906.	1907.
Animal products	$ 7,278,337	$ 5,959,670
Vegetable products	3,429,212	4,859,038
Mineral products	92,243,658	88,341,039
Wines and liquors	72,039	47,223
All other articles	2,688,565	3,022,486
Total exports	$105,711,811	$102,229,456

Considering the trade of Chile with the various countries, as is shown by the table on the foregoing page, it will be seen that Great Britain ranks first both in imports to, and exports from, Chile, taking over one-half of the latter and supplying nearly 40 per cent of the former, Germany ranks second in importance and the United States third.

Considering the trade analysis by countries we find that Argentina supplies the largest amount of animal products, consisting mostly of live stock, Great Britain occupying second place and the United States third, having exported $919,142 worth in 1907. Arms and ammunition are mostly supplied by Germany, as well as chemical products, while in coal, oils, etc., Great Britain leads again with $8,826,542, Australia being second with $2,522,894, and the United States third with $1,383,235, with Germany a close fourth. In imports of machinery Great Britain again leads with $7,351,153, Germany being second in importance with $5,467,176, and the United States third with $3,101,783. Great Britain also leads in the importation of mineral products with $9,006,858, Germany again being second with $7,926,572, and Belgium and the United States third and fourth with $1,935,338 and $1,455,746, respectively. Germany furnishes the largest part of the imports of paper, etc., having imported $1,313,291 worth in 1907, the United States being second in importance with only $500,366. Great Britain furnishes nearly one-half of the total amount of textiles imported into Chile, having imported $12,147,909 worth in 1907, Germany being second in importance with $6,515,326 and France third with $2,098,324. It is noteworthy that India also furnishes $1,166,141 worth of textiles, which are not included in the total given for Great Britain. In the imports of vegetable products the United States leads with $2,884,957, Germany being second with $1,693,215 and Great Britain third with $1,098,521. Of wines and liquors France furnishes the largest share, amounting to $641,602, Great Britain being second in importance with $558,527.

Considering the destination of the exports, which are divided into vegetable, mineral and animal products, it will be seen from the table appended hereto that of Chile's exports of animal products Great Britain received the largest share, viz: $2,997,187, Germany being second with $1,954,903. Of the mineral products Great Britain receives over one-half of the total, viz: $45,806,297, Germany being second with $17,539,742 and the United States third with $6,803,813. The major part of Chile's exports of vegetable products is also shipped to Great Britain, amounting in 1907 to $2,087,340, while Argentina ranked second with $804,020 and Germany third with $742,080.

DESTINATION OF EXPORTS.

The following statement shows the principal articles of export from Chile and their destination during the past three years:

Articles, and countries whither exported.	1905.	1906.	1907.
Animal products:			
United States	$540,642	$192,005	$154,607
Argentina	85,164	187,086	9,074
Bolivia	36,998	17,260	39,491
France	314,476	523,226	537,551
Germany	1,611,205	1,331,014	1,954,903
Peru	151,612	173,076	128,809
United Kingdom	562,525	1,158,691	2,997,187
Mineral products:			
United States	15,043,557	17,269,153	6,803,813
Belgium	1,596,288	1,789,536	1,123,404
France	7,739,305	5,717,958	5,296,477
Germany	17,232,170	16,887,073	17,539,742
Italy	1,472,620	1,177,422	471,854
Netherlands	1,151,331	4,573,184	4,209,153
Spain	666,454	1,099,568	443,037
United Kingdom	34,310,898	42,716,430	45,806,297
Vegetable products:			
United States	38,807	39,035	131,362
Argentina	471,408	440,020	804,020
Belgium	46,460	40,290	89,554
Bolivia	368,487	248,696	323,901
Brazil	124,850	164,029	133,179
France	66,626	129,125	61,561
Germany	893,851	546,152	742,080
United Kingdom	2,092,860	1,135,196	2,087,340

The increase of Chile's trade within the last few years is shown by the following table, giving the imports and exports from 1902 to 1907, inclusive, in Chilean pesos:

	1902.	1903.	1904.	1905.	1906.	1907.
Imports.	$132,645,000	$142,471,000	$157,152,000	$188,596,418	$236,040,991	$293,681,855
Exports.	$186,880,000	$196,059,000	$217,559,000	$273,375,344	$289,513,522	$280,080,730

TRANSIT TRADE. This trade consists of goods shipped to Chile in transit for other countries, especially Bolivia and the Argentine Republic, and of merchandise shipped through Chilean ports to foreign countries. The transit trade with Bolivia is of considerable importance, being carried on chiefly through the ports of Arica and Antofagasta, while the transit trade with the Argentine Republic comes nearly all through Puerto Montt. The total amount of merchandise imported in transit to Bolivia amounted to 18,208,506 pesos in 1907, 17,760,044 of which was imported through the port of Antofagasta and 448,462 through the port of Arica. The total amount of merchandise exported from Bolivia through Chilean ports amounted to 37,052,351 pesos, of which 36,947,991 were exported through Antofagasta and 104,360 worth through Arica. The transit trade with the Argentine Republic amounted to 149,252 pesos in 1907, consisting of imports only, all of which came through Puerto Montt.

CUSTOM HOUSE DISTRICTS. Custom houses are situated at the following ports: Arica, Pisagua, Iquique, Tocopilla, Antofagasta, Taltal, Caldera, Carrizal Bajo, Coquimbo, Valparaiso, Talcahuano, Coronel, Valdivia, Puerto Montt, and Ancud. These are called the major ports

and upon them are dependent a number of minor ports, through which latter merchandise may be imported or exported, but the proper entries must be made at the corresponding major port. The following list shows the minor ports and the respective Custom House upon which they are dependent:

PORTS.	CUSTOM HOUSE.
Junin	Pisagua
Caleta Buena, Punta de Lobos	Iquique.
Gatico, Huanillos de Cobija	Tocopilla.
Coloso, Mejillones	Antofagasta.
Paposo	Taltal.
Chañaral de las Animas	Caldera.
Huasco, Peña Blanca, Sarco	Carrizal Bajo.
Herradura y Guayacan, Tongoy, Totoralillo, Puerto Oscuro	Coquimbo.
Quintero, Los Vilos, Papudo y Zapallar, Pichidangui, San Antonio, Matanzas, Pichilemu, Constitución, Curanipe, Buchupureo, Llico	Valparaiso.

PORTS.	CUSTOM HOUSE.
Tomé, Penco y Lirquen, San Vicente	Talcahuano.
Lota, Lebu	Coronel.
Trumao y Rio Bueno, Carahue, Imperial Bajo, Queule, San Pedro	Valdivia.
Calbuco	Puerto Montt.
Melinka, Quellon, Quemchi, Quicavi, Puerto Grille, Maullin, Achao	Ancud.

Punta Arenas, in the Territory of Magallanes, is a free port and merchandise may be imported and exported free of duty.

CUSTOMS TARIFF. The majority of articles imported into Chile pay a duty of 25 per cent on a valuation fixed by the Chilean Government, which values are from time to time revised and changed in accordance with the market value of the merchandise. A permanent committee, consisting of the President of the Custom House, the Chief Appraiser, and a number of merchants appointed by the President of the Republic for the purpose, has charge of the revision of the tariff and reports once a year to the Government advising the changes which it deems necessary and expedient.

The following is a list of the articles paying 60, 35, 15 and 5 per cent duty, or a specific duty, or those which may be introduced free of duty, all articles not mentioned under one of these headings being subject to a duty of 25 per cent.

PRIVATE RESIDENCE AT PUNTA ARENAS.

A number of fine residences may be found at Punta Arenas, which is lighted throughout by electricity, has good water works and several public buildings, among them two theaters and several schools.

CUSTOMS LAWS.

Law No. 980, Dated December 23, 1897. Import Tariff.

(Corrected up to January, 1909.)

ARTICLE 1.—All foreign products or goods shall, on importation for consumption, be liable to a duty of 25 per cent on their valuation, with the exception of those subject to a duty of 60, 35, 15, and 5 per cent, those liable to specific duties, and duty-free articles.

ART. 2.—*Articles subject to a duty of* 60 *per cent.*

1. Starch.
2. Canary seed.
3. Articles of any material, printed, lithographed, or engraved, with or without pictures, excepting books, periodicals, or daily papers.
4. Articles of leather.
5. Manufactures of cardboard or paper.
6. Articles of tin plate, other than tools.
7. Coffins and funeral urns.
8. Red pepper, including ground pepper plant.
9. Aniseed.
10. Oats.
11. Playing cards.
12. Walking sticks.
13. Hair, human, and articles of human hair.
14. Boxes and cornets for bonbons.
15. Cases fitted together or not.
16. Boots and shoes of all kinds, except boots and shoes of 15 centimeters or less in length and those of rubber.
17. Baskets, empty.
18. Carriages, wagons, carts, handcarts, and wheelbarrows, mounted or in detached parts, except axle boxes, axles, springs, and horns for carriages.
19. Meat, salted, dried, or smoked ("cecinas").
20. Mattresses, including spring mattresses, mounted or not.
21. Preserved foods, except salmon and sardines.
22. Cumin.
23. Wreaths, crosses of flowers, and other similar funeral ornaments.
24. Neckties of all kinds.
25. Corsets.
26. Hair, vegetable or animal.
27. Sweetmeats and all kinds of bonbons other than medicinal.
28. Pickles.
29. Brooms, shovels, and brushes, other than tooth or nail brushes.
30. Labels of all kinds, for bottles and other purposes.
31. Macaroni, vermicelli, etc.
32. Fruit, dried, preserved in the juice or alcohol.
33. Biscuits.
34. Ham.

35. Sirups.
36. Books or copy books, containing printing or not.
37. Wood, manufactured, i. e., planed, dovetailed, turned, etc.
38. Handles for brooms or tools.
39. Frames for pictures.
40. Masks, except fencing and apiculturists' masks.
41. Corn (maize).
42. Malt for the manufacture of beer.
43. Mallets, wooden.
44. Moldings of all kinds.
45. Furniture, fitted together or not, vanished or white.
46. Raisins.
47. Sugar pastiles other than medicinal.
    spun goods.
48. Perfumery.
49. Doors and windows, wooden, fitted together or not.
50. Cheese.
51. Gratings or balustrades of iron or steel, for balconies, windows, gardens, etc.
52. Ready-made clothing, except seamless clothing and wearing apparel otherwise dutiable.
53. Sal soda or hydrated or anhydrous carbonate.
54. Sausages and stuffed meats of all kinds.
55. Sauces of all kinds.
56. Roofing tiles, tiles and bricks for paving, wall lining, and ornaments.
57. Bacon.
58. Wax candles.
59. Vinegar.

ART. 3.—*Articles subject to a duty of* 35 *per cent.*

60. Fans.
61. Curtain loops.
62. Albums, blank, or with printing, for portraits, music, collections, etc.
63. Carpets and rugs.
64. Almonds.
65. Opera glasses.
66. Side and fire arms.
67. Accordions and mouth organs.
68. Manufactured articles and tissues containing silk or imitations thereof (except ready-made clothing proper, thread, sieve cloth ("clarin"), plush for men's hats, epaulettes, galloons or trimmings, and spun goods).
69. Articles of netted tissues of linen or wool, also knitted goods.
70. Articles of sole and undressed leather, except machine belting of all kinds.
71. Articles combined with gold and silver, excepting jewelry, watches, spangles or threads of precious metal, epaulettes, galloons or trimmings, and
72. Articles of metal with gilt or silvered parts.
73. Wares of osiers, straw, palm, cane, willows, and all kinds of twigs, roots or fibers of trees or plants, except hats and baskets.
74. Ceramic tiles.
75. Buckets, tubs, and vats of wood, fitted together or not.
76. Crowbars ("barretas").
77. Batiste, cloths ("bramantes"), or cretonnes, Brittany cloth, cambric, damasks or damasked linen, Dutch linen, Irish linen, and "olanes," containing flax.
78. Trunks, valises, and traveling bags.
79. Shoe blacking and polish.
80. Blonde, lace and point ("miñaques").
81. Bits of iron or steel.
82. Cigar holders and tobacco pipes.

83. Buoys of iron or steel, with their chains and anchoring accessories.
84. Musical boxes.
85. Boxes for toilet powder.
86. Metal safes.
87. Manufactures of tortoise shell.
88. Cartridges and caps for firearms.
89. Houses of iron, steel, or wood.
90. Tooth and nail brushes.
91. Cigar cases and snuffboxes.
92. Belts.
93. Rockets and fireworks.
94. Perambulators.
95. Glue.
96. Cornices, rods, and accessories, for curtains.
97. Crystal ware, fine.
98. Penknives.
99. Curtains, blinds, Venetian blinds, etc.
100. Paintings; engraved, painted or lithographed pictures; drawings, photographs, impressions, and other similar ornamental reproductions, framed or not.
101. Shawls and kerchiefs, fine, of cashmere, called "ternaux."
102. Mantelpieces and stoves of bronze, marble, wood, and composition.
103. Chocolate in paste or powder.
104. Mirrors with plates exceeding 80 centimeters in height.
105. Statues and busts.
106. Cases, empty, for jewelry and plate.
107. Bell jars of crystal or glass.
108. Lanterns, carriage.
109. Door mats.
110. Fringes.
111. Flowers and plants, artificial.
112. Flower vases, stands, and other articles for household ornament.
113. Foot muffs ("folgos").
114. Boiler bottoms of copper.
115. Match boxes of mother-of-pearl.
116. Matches.
117. Liquor flasks, pocket, with fittings.
118. Blankets, fine, of wool pure or mixed with cotton.
119. Primers for firearms.
120. Cases for firearms.
121. Galloons of tinsel.
122. Caps.
123. Grease, pure or mixed.
124. Gloves.
125. Musical instruments and accessories and spare parts thereof, except metallic strings, pegs, wrought mechanisms for pianos, keyboards, and felt-covered hammers.
126. Cages.
127. Jewelry, imitation.
128. Games, such as checkers, dice, draughts, lotto, etc.
129. Toys.
130. Books, printed, with binding of tortoise shell, mother-of-pearl, ivory or their imitations, or with parts of gold or silver, or of silver or gilt metal.
131. Liqueur-stands.
132. Garters.
133. Plates, mirror, silvered, exceeding 80 centimeters in height.
134. Building wood, unwrought or sawn, excepting pine.
135. Butter, pure or mixed.

136. Muffs or "regalias" other than of fur.
137. Rugs or ponchos for camping or traveling.
138. Tablecloths and napkins made partly of linen.
139. Manufactures of ivory, except plates for piano keys.
140. Marble, polished.
141. Billiard tables and accessories.
142. Game bags.
143. Shot.
144. Tinsel and spangles of brass.
145. Cloth for billiard tables.
146. Handkerchiefs, partly of linen.
147. Cigarette paper.
148. Wall paper in imitation of cloth or leather, or with gold or silver designs.
149. Fish, dried.
150. Furs prepared for ornaments or cloaks.
151. Pieces of wood prepared for paving, wainscots, and ornaments.
152. Twine, cord, yarn of hemp, esparto, Manila hemp or jute, not exceeding 30 millimeters in circumference.
153. Plates of enameled iron, for signs.
154. Sheet iron, galvanized, corrugated.
155. Feathers, ornamental, and articles of feathers.
156. Feather dusters.
157. Powder, gun.
158. Powder flasks and shot pouches.
159. Porcelain.
160. Purses of mother-of-pearl.
161. Timepieces, except watches.
162. Extra and detached parts of billiard tables, except cushions and slates.
163. Bed linen.
164. Sardines.
165. Table covers or rugs.
166. Hats, except common hats called "de petate," and those of straw, shavings, cane, palm, and oilcloth.
167. Leather tips for billiard cues.
168. Wads for firearms.
169. Bath tubs.
170. Braces or suspenders.
171. Shag other than common shag with uncut pile.
172. Truffles.
173. Candles of spermaceti, stearine, or composition, and tapers.
174. Colored glass, with figures or paintings, corrugated glass, muslin glass, dulled and beveled glass.
175. Glass exceeding 4 millimeters in thickness and 80 centimeters in length.
176. Manufactures of zinc.

ART. 4.—*Articles subject to a duty of* 15 *per cent.*

177. Ornaments of straw, for hats or other uses.
178. Spirits of turpentine.
179. Hourglasses.
180. Saffron.
181. Sticks for parasols and umbrellas.
182. Hooks and oarlocks for boats.
183. Axle boxes, axles, and horns for carriages.
184. Bottles of glass or stoneware, for liquors.
185. Boats of all kinds, of wood, fitted together or not, with steam or electric motors.
186. Mineral pitch.
187. Easels for painters.

188. Chains of iron or steel, with links not exceeding 40 millimeters in circumference.
189. Steam boilers imported separately from the machines.
190. Linings for hats.
191. Roman or Portland cement.
192. Chloride of potassium.
193. Coral, wrought or not.
194. Bends of iron or steel, for vessels.
195. Dynamite and other explosives.
196. Staves, wrought.
197. Plaiting ("esterilla") and canvas for embroidering.
198. Stearine.
199. Lanterns of talc.
200. Silk plush and its imitations, and plush of mixed silk for men's hats.
201. Galloons or trimmings of gold or silver, even combined with silk or its imitations.
202. Vegetable grease or tallow.
203. Thread, bullions, tinsel, and embroidery of gold or silver, even combined with silk or its imitations.
204. Leaf, gold, silver, or tinsel, for gold or silver plating.
205. Leaves for artificial flowers.
206. Spangles and thread of gold, silver, or tinsel.
207. Forks, wooden.
208. Tissues of hemp or jute, for sacks, and tissues of cotton called Osnaburgs or "tocuyo," coarse, i. e., having up to 16 threads in warp and weft.
209. Fire bricks.
210. Sailcloth of linen or cotton, from No. 1 to No. 7.
211. Pieces of marble, sawn or in blocks.
212. Capstans for anchors.
213. Springs of iron or steel.
214. Nitrate of potash.
215. Gold, rolled, for dentists.
216. Paper for artificial flowers.
217. Pumice stone.
218. Blasting powder.
219. Bridges of iron or steel.
220. Bands for hats.
221. Watches.
222. Oars.
223. Springs for carriages or carts.
224. Sacks, empty.
225. Sulphate of copper, crude.
226. Sleepers of iron or steel.
227. Household utensils, of wrought or cast iron, tinned or galvanized, excepting enameled or porcelain-lined utensils and cooking stoves.
228. Vanilla.
229. Ribs and frames for parasols and umbrellas.
230. Beams, X iron columns, and other similar pieces for uniting the same, of iron or steel, for building purposes, wrought in any manner.

ART. 5.—*Articles subject to a duty of* 5 *per cent.*

231. Busks and springs of iron or steel, for corsets and clothing, covered or not.
232. Alum.
233. Asbestos in lumps or powder
234. Scales for chemical laboratories or assaying.
235. Benzine, common.
236. Bichromate of potash.
237. Bisulphate of soda.

238. Boats and ships of all kinds, of iron or steel, fitted together or not; steam, rowing, sailing, or electric.
239. Kid skins for gloves.
240. Cocoa, raw or in the bean.
241. Railway switches, complete, of iron or steel; also detached parts thereof.
242. Cinnamon.
243. Conducts or tubes of composition metal, lead, copper, bronze, iron or steel, galvanized or not, including elbows, joints, and other accessories.
244. Capsules of metal, for bottles.
245. Cars for portable or elevated railways.
246. Sieve cloth ("clarin") of silk or its imitations.
247. Pegs for musical instruments.
248. Chlorate of potash.
249. Chloride of lime.
250. Railway passenger coaches.
251. Machine belting of all kinds.
252. Rennet, liquid or in powder.
253. Plates of ivory or its imitations, for piano keys.
254. Epaulets of gold or silver, even combined with silk or its imitations.
255. Degras and other special materials for tanning.
256. Elastics for foot wear.
257. Veneers of wood.
258. Keyboards for pianos.
259. Emery and tripoli.
260. Spermaceti.
261. Lead foil, for bottle caps.
262. Fibers, raw, of Siam, esparto, piassava, rice roots, etc., for brushes or brooms.
263. Filters.
264. Bellows for blacksmiths and tinsmiths.
265. Bellows for fumigating.
266. Caoutchouc, raw or in sheets.
267. Sheet iron or steel, corrugated, neither painted nor galvanized.
268. Gold and silver articles and jewelry in general.
269. Implements, garden, in sets.
270. Pencils for carpenters.
271. Yeast and leaven.
272. Tape measures for carpenters.
273. Oil cups for machines.
274. Hops.
275. Piano hammers, covered or not with felt.
276. Measuring appliances for artisans and industrial uses.
277. Methods for teaching music.
278. Wicks.
279. Paper, colored, mottled, grained or the like, for bookbinding.
280. Paraffin in lumps.
281. Pedals and castors for pianos.
282. Pearls.
283. Bolts of copper, bronze or composition metal, and rods for the manufacture thereof.
284. Precious stones.
285. Chamois leather.
286. Parts of piano mechanisms, finished.
287. Caustic Potash.
288. Sal ammoniac.
289. Caustic soda.
290. Silicate of soda, liquid or solid.
291. Sulphide of sodium.
292. Talc, for the manufacture of soap.

293. Metal cloth and wire netting.
294. Bookbinders' cloth.
295. Connecting pieces ("uniones") for transmission belting.
296. Sumac for tanning and dyeing.

ART. 6.—*Articles subject to specific duties.*

			Pesos.*
297.	Oils, refined or unrefined (excepting pure medicinal oils, perfumed oils and gasoline, naphtha, paraffin, petroleum, and kerosene oils)	kilo..	0.14
298.	Linseed oil, raw or boiled	do...	.20
	Alcohol, spirits of wine, liquors and brandies, sweetened or not:		
299.	In bottles	doz. bottles..	15.00
300.	In other receptacles	liter..	1.50
	Bitters with an alcoholic basis:		
301.	In bottles	doz. bottles..	12.00
302.	In other receptacles	liter..	1.20
	Sugar:		
303.	Refined, in lumps or powder, dry or moist	100 kilos..	14.35
304.	White, granulated or in powder, dry or moist, such as "Rosa Emilia"	100 kilos..	11.40
305.	Granulated, raw or muscovado, dry or moist	do....	6.50
306.	Unrefined ("chancaca" or "concreto"), dry or moist	100 kilos..	5.60
307.	Coffee	kilo..	.10
308.	Ordinary cardboard	do...	.15
309.	Barley	100 kilos...	1.50
	Beer:		
310.	In bottles	doz. bottles..	3.00
311.	In other receptacles	liter..	.30
312.	Cigars	kilo..	6.00
313.	Cigarettes, including weight of packages (except wooden or metallic cases)	kilo..	9.00
314.	Flour, wheat	100 kilos..	2.00
315.	Blotting paper and common packing paper	kilo..	.15
316.	Snuff	do...	5.00
	Salt:		
317.	Common, in lumps	metric quintal..	2.50
318.	Refined or semirefined	kilo..	.10
	Tobacco:		
319.	In the leaf	do..	2.60
320.	Cut	do..	4.00
321.	Tea	do..	1.00
	White or red wine:		
322.	In bottles, including medicinal wines	doz. bottles..	12.00
323.	In other receptacles	liter..	1.20
324.	Yerba mate	kilo..	.05

ART. 7.—*Articles to be admitted duty free.*

325. Water.
326. Wire of any metal, covered or not with other materials.
327. Cotton, raw, ginned or not.
328. Vegetable tar, impure creosote or coal creosote.
329. Altars, reliquaries, ornaments, sacred vases, and other articles intended for divine worship, provided the same be imported on account of, and destined to communities, convents, or churches.
330. Anchors and grapnels of iron or steel.
331. Live animals other than those liable to a specific duty.
332. Diving apparatus and requisites.

*Chilean peso=$0.365 U. S. currency.

333. Plows and extra parts thereof.
334. Staples or hooks of steel, for fastening fences and supporting vines.
335. Mercury.
336. Fire engines and their accessories, as well as all other fire-extinguishing apparatus destined exclusively to the use of fire brigades.
337. Speaking trumpets for ships.
338. Pitch.
339. Treenails for boats.
340. Cables of wire.
341. Chains of iron or steel, in which the metallic parts exceed 40 millimeters in circumference.
342. "Camotes" (a kind of sweet potato).
343. Coal of all kinds.
344. Geographical, astronomical, or topographical maps and charts, plans, models, drawings, and patterns.
345. Rye.
346. Anchor stocks.
347. Cyanide of potassium and sodium.
348. Copper or composition nails for sheathing vessels and nailing boats.
349. Copper and bronze in sheets.
350. Binnacle compasses.
351. Stoppers for bottles or flasks.
352. Cork in sheets or pieces.
353. Log lines for ships.
354. Staves, unwrought
355. Scupper nails and rivets.
356. Effects intended for diplomatic agents and their secretaries, accredited to the Chilean Government, imported from the country of origin for their use or consumption, in quantities not exceeding the value 20,000 pesos, national currency, for the first year, and 4,000 pesos of same currency for every subsequent year, provided that reciprocity exists on the part of the countries represented by them, and further that such ministers and agents do not exercise, in addition to their diplomatic functions, a commercial profession.
357. Effects intended for the use of or consumption by diplomatic agents and their secretaries, in quantities not exceeding in value one year's salary of said officials, and provided the goods be imported either four months before or four months after their return to the Republic.
358. Articles of armament being the exclusive property of the State, such as cannon, gun carriages, torpedoes, rifles, swords, axes, revolvers, and projectiles, as well as accessories and extra parts therefor and also for men-of-war. Articles imported by the Government for delivery to other parties and all other goods not constituting mere equipment accessories, such as tents ("carpas"), haversacks, saddles, and harness for cavalry, ambulance stores, clothing, etc., shall not be entitled to this exemption.
359. Axles (except carriage axles), tires, and wheels of iron or steel.
360. Baggage imported by travelers, i. e., clothing, footwear, books, jewelry, and toilet articles for the use of the importer, in a quantity proportioned to his condition, but with the exception of table service and furniture, even used, and of entire piece of tissues.
361. Cat-head shackles.
362. Hawse pipes.
363. Handspikes.
364. Tin in bars or sheets.
365. Oakum.
366. Ferrocyanide of potassium or yellow prussiate.
367. Ferrocyanide of potassium or red prussiate.
368. Cotton yarn for matches.

369. Hoops of iron, steel, or wood.
370. Common, red, or amorphous phosphorus.
371. Flotsam and Jetsam.
372. Fresh fruits.
373. Primers for mines.
374. Geographical and astronomical globes.
375. Gums and resins for industrial purposes.
376. Shackles ("grilletes") for anchors or chains.
377. Guano.
378. Pulleys of any material.
379. Miner's fuses.
380. Implements and their extra parts for use in agriculture, mining, the arts, trades and industry, not specially mentioned.
381. Iron and steel in plain sheets, neither painted nor galvanized.
382. Iron and stel, crude, in ingots or bars of any shape.
383. Yarn for looms, of cotton, jute, hemp, pita, linen or wool, and yarn composed of two or more such materials. (See Law 1166, of January 9, 1899.)
384. Ordinary tin plate.
385. Assaying and cupelling furnaces and accessories.
386. Presses and their accessories other than of wood.
387. Materials and dyes suitable for the manufacture of cloth or paper.
388. Surgical, physical, mathematical, and other scientific instruments.
389. Telephone and telegraph apparatus, insulators, iron or steel posts and other appliances for telegraphs and telephones, except wooden cross pieces for posts.
390. Old cordage.
391. Rattan, unmanufactured or prepared for caning chairs.
392. Slate pencils.
393. Patent ballast with pumps and accessories, for ships.
394. Firewood.
395. Printed books (other than those dutiable at 35 per cent), trade catalogues, reviews, and other periodicals and daily papers.
396. Fine wood for cabinetmakers, unwrought.
397. Machines, apparatus, and special accessories for illuminating by carbureted hydrogen gas and electricity, except lamps of all kinds, but including bulbs and candles.
398. Machines and apparatus for use in agriculture, mining, the arts, trades, and industry.
399. Manila hemp and jute, raw.
400. Manila hemp for cordage.
401. Raw materials for the manufacture of cordage and sacking, i. e., manila or other hemp, and jute.
402. Iron or steel plant for railroads, whether steam, animal, or electric traction, and likewise portable or elevated railway plant, with the exception of materials dutiable at the rate of 15 per cent.
403. Crude ores.
404. Molds for casting printer's forms and blocks.
405. Coin, excepting small national coins, under 835 thousandths in standard.
406. Furniture, instruments, and tools of immigrants, up to 500 pesos in value.
407. Models of handwriting and models for teaching drawing, science, or arts.
408. Samples of goods not liable to a higher duty than 2 pesos.
409. Gold in dust or ingots.
410. Dyewoods in their natural state, in shavings, sawdust, or crushed.
411. Timber for ship's yards and masts.
412. Polishing paper and emery cloth or paper.
413. Unsized or half-sized paper for printing and tape paper for telegraphs.
414. Paper for sheathing vessels.
415. Pulp mechanically ground and chemical for the manufacture of paper.

416. Animal hair.
417. Cotton seed.
418. Palm-tree seed.
419. Crude petroleum.
420. Detached parts of machinery.
421. Writing slates for schools, framed or not.
422. Copper, bronze, zinc, or composition sheets for sheathing vessels.
423. Exotic plants and their seeds.
424. Silver in ingots or scrap.
425. Plumbago.
426. Lead in sheets, bars, or plates.
427. Fishery produce caught by national vessels.
428. Plowshares.
429. Copra.
430. Harrows and rakes.
431. Ship's stores.
432. Stores recovered from wrecked vessels not exceeding in aggregate value 500 pesos.
433. Crude saltpeter.
434. Leeches.
435. Sulphate of iron for commerce.
436. Tissues waterproofed by means of rubber.
437. Earth for smelting furnaces.
438. Printing and lithographic ink.
439. Old rags for paper making.
440. Wheat.
441. Old ship's sails.
442. Zinc in bars or sheets.
443. Calcium carbide.

ART. 8.—Female animals of the bovine race, over a year old, shall be liable, per head, to the specific duties hereinafter named, viz., in 1898, 3 pesos; in 1899, 6 pesos; in 1900, 9 pesos; from and after 1901, 12 pesos.

Male animals of the bovine race, over a year old, shall likewise be liable, per head, to the following duties: In 1898, 4 pesos; in 1899, 8 pesos; in 1900, 12 pesos, from and after 1901, 16 pesos.

Calves and heifers, under a year old, shall be exempt from import duty.

The following duties shall be leviable on animals of the bovine race, per head: In 1898, 50 centavos; in 1899, 1 peso; in 1900, 1 peso 50 centavos; from and after 1901, 2 pesos.

Animals liable to the above-named duties shall be exempt from toll dues established in virtue of the law of October 16, 1868.

Cattle of the country which, after having been exported, re-enter across the Cordillera region shall be exempt from the foregoing duties, provided the conditions and formalities prescribed by the President of the Republic in subsequent regulations be duly complied with.

Bovine animals imported by sea from abroad shall be liable to an additional duty of 10 pesos per head.

[Articles 9, 10, and 11 will be found under "Export Tariff," below.]

ART. 12.—Should goods dutiable in virtue of the present law at 60 and 35 per cent, owing to the material entering into their manufacture, such as articles of tin plate, paper, cardboard, leather, skin, etc., contain an admixture of another material liable to a lower duty, the rates of 60 and 35 per cent shall nevertheless be collected, unless the lowest taxed component material exceeds 75 per cent of the value of the goods, which would render the whole liable to the general duty of 25 per cent.

ART. 13.—In every case where the present law stipulates an exceptional rate of, or exemption from duty for certain goods, owing to the intended use thereof, such as plush for men's hats, telegraph accessories, etc., it is understood that such goods shall only enjoy the privileged treatment when exclu-

sively destined, by their nature or kind, for the purposes stated, otherwise the same shall be liable to the general duty of 25 per cent.

ART. 14.—For the application of the specific duties established for wines and liquors imported in bottles, the bottles referred to shall be held to be those of ordinary size, i. e., of a capacity of from 90 centiliters to 1 liter for bitters, geneva, sweet liqueurs and absinthe, and from 60 to 75 centiliters for wines and other liquors. When such beverages are imported in bottles exceeding the maximum or below the minimum fixed above, the examining official will so certify in the declaration, and the duty shall be collected with a proportionate increase or decrease as the case may be.

ART. 15.—The new edition of the valuation tariff established in accordance with the Customs Ordinance shall be revised by a commission consisting of the customs superintendent, as president, the customs administrator at Valparaiso, the chief examiner and such number of examiners as the President of the Republic may designate for that purpose, three merchants and three manufacturers appointed by the Executive, and a person designated by each of the national societies constituted for the development of industry, agriculture, mining, and viticulture. This commission shall hold its meetings in conformity with the regulations established by the President of the Republic. Pending the publication of the new edition of the above-mentioned valuation tariff the President of the Republic is authorized to maintain in force the tariff of December 4, 1895.

ART. 16.—Notwithstanding the provisions of articles 54, 55, and 56 of the Customs Ordinance, one year shall be the maximum time allowed for the storage of goods in customs warehouses, and no extension thereof shall be granted.

ART. 17.—In like manner, the deposit of goods in private bonded warehouses is authorized during six months, and no extension shall be granted.

ART. 18.—The charge for warehousing shall amount to 1 per cent of the value of the goods, after deducting, at the expiration of the storage term, the quantities found to be damaged.

ART. 19.—The following dispositions are repealed, viz.: Articles 32, 33, 34, 39, 40, 41, 42, 43, 44, 45, and 65 of the Customs Ordinance of December 26, 1872; laws dated September 12 and November 18, 1874; July 6 and September 13, 1878; September 2 and October 1, 1880; January 22 and August 29, 1885; August 27, 1886; December 31, 1888; August 30, 1889; January 19 and October 30, 1893; January 10 and August 28, 1894; articles 1 and 2 of law No. 920 of February 23, 1897, and all other laws or sections of laws containing general dispositions relative to the payment of import or export duties.

ART. 20.—The President of the Republic is empowered to carry the present law into effect as soon as the same has been published in the Diario Oficial, to render applicable a new valuation tariff and to appropriate a credit of 20,000 pesos for the publication of new tariffs, collection of samples, and other expenses.

SUPPLEMENTARY LAWS.

LAW NO. 990.—SOLE ARTICLE.—Cotton yarn and thread, also machinery imported into the country by manufacturers of cotton goods for use in connection with their business, shall be exempt from import duty until the year 1920.

LAW NO. 1003.—SOLE ARTICLE.—Empty sacks imported for the transport of ores shall be exempt from customs duties.

LAW NO. 1166.—SOLE ARTICLE.—Tariff No. 383 shall read as follows: "Yarn and thread for weaving, embroidering, or marking."

LAW NO. 1172.—ARTICLE 6.—The importation into the territory of the Republic of silver coins bearing the national stamp and of a standard below eight hundred and thirty-five thousandths is prohibited.

LAW NO. 1187.—ARTICLE 1.—The importation in transit of wool, horsehair, and skins in a natural state across the passes at Antuco and Lonquimai, in the customs district of Talcahuano, and at Pucon and Nahuelhapi, respectively, situated in the Valdivia and Melipulli customs districts, is authorized.

ARTICLE 2.—The President of the Republic will establish regulations for the importation and clearance of the aforesaid products.

LAW NO. 1208.—SOLE ARTICLE.—The following shall be included among the goods admitted duty free on importation and enumerated in article 7 of the law No. 980 of December 23, 1897, viz.: Wool, prepared, scoured or not imported through the principal or secondary customs ports of the Cordillera.

LAW NO. 1455.—SOLE ARTICLE.—Glass flasks with automatic metal or rubber lids and rubber stoppers are declared to be admitted free.

LAW NO. 1466.—SOLE ARTICLE.—Explosive called "dynamite" is to be added to the free list, under article 7 of the law No. 980 of December 23, 1897.

LAW NO. 1489, *December* 9, 1901.—SOLE ARTICLE.—Hyposulphate of soda shall be included under articles to be free of duty.

LAW NO. 1515, *January* 2, 1902.—ART. 116.—Alcohols and wines shall be subject to an additional duty of 10 per cent over and above the duty prescribed in the Tariff. Native wines and alcohols, when shipped through one of the ports of the country, shall likewise be subject to this extra duty.

The revenue derived from this tax shall be applied to the creation and maintenance of laboratories, annexed to the Custom Houses, in which the various wines, etc., shall be analyzed and their purity and quality established.

LAW NO. 1607, *July* 29, 1903.—SOLE ARTICLE.—All nitrates of soda, if used for agricultural purposes as a fertilizer, shall be admitted free of duty.

LAW NO. 1782, *December* 20, 1905.—SOLE ARTICLE.—Bronze and iron bedsteads, as well as bedsteads made of other metals, shall be subject to a duty of 35 per cent, being classified under article 3 of Law No. 980, December 23, 1897.

LAW NO. 1911, *February* 1, 1907.—SOLE ARTICLE.—Wooden matches shall be subject to a specific duty of 20 centavos per kilo, gross weight, for a period of three years. At the expiration of three years the duty shall be reduced at the rate of 2 centavos per kilo annually, until a rate of 14 centavos per kilo, gross weight, shall have been reached.

Recent tariff changes in Chile are covered by the law of December 16, 1907, whereby the President of the Republic was authorized to reduce progressively the duty on articles made of linen and woolen cloth and of tricot; galvanized corrugated iron; portable houses; shoes of all kinds, excepting those of less than 15 centimeters, or 5.85 inches in length, or those made of rubber; and on sugar of all grades. This law was put in force by a decree of the President dated March 21, 1908, making the following changes:

Articles.	Old Duty. *Per cent ad val.*	Jan. 1, '09. *Per cent ad val.*	July 1, '09. *Per cent ad val.*
Galvanized corrugated iron	35	30	25
Articles made of linen and woolen cloth, and tricot	35	30	25
Portable houses worth less than 15,000 pesos Chile gold, or $5,475 United States currency	35	30	25
Shoes over 15 centimeters or 5.85 inches in length, or not made of rubber	60	55	50

The duty on shoes will be further reduced to 45 per cent ad valorem on January 1, 1910; to 40 per cent on July 1, 1910, and to 35 per cent on January 1, 1911.

REDUCTIONS OF DUTY ON SUGAR.

By the same decree the duty on sugar is to be gradually reduced, as indicated in the following table, the amounts being in United States currency per 100 kilos (220 pounds):

Description.	Tariff of 1907.	After July 1, 1908.	After Jan. 1, 1909.
Refined	$4.87	$3.50	$3.29
White, granulated or pulverized	3.80	2.19	....
Unclarified, granulated or muscovado	2.73	1.33	....
Raw	2.40	1.20	....

REDUCTION OF DUTY ON BOOTS AND SHOES.

Ad valorem duties are levied in Chile not on the basis of the actual value of the imported article, but according to the value fixed in the tariff of values. The new tariff of values promulgated in 1908 reduces the valuation of boots and shoes, thus indirectly causing a reduction in the amount of duty to be levied on these articles.

The following table covers the new and old values in terms of United States currency, with the rate of duty collected on the basis of those values:

Tariff No. 1903.	Tariff No. 1908.	Description.	Value per dozen. 1903.	Value per dozen. 1908.	Ad val. duty. %
84	96	Boots and shoes of leather and other materials, except silk, for children, less than 15 centimeters	$8.76	$6.57	25
85	97	Same, with silk	17.52	13.14	25
87	98	Boots and shoes of leather and other materials, except silk, for boys	17.52	13.14	60
87	99	Same, with silk	26.28	21.90	60
88	100	Boots of leather and other materials, except silk, for women and girls	35.04	26.28	60
89	101	Same, with silk	43.80	35.04	60
90	102	Boots of leather of all classes, with top not more than 45 centimeters	73.00	65.70	60
91	103	Same, exceeding 45 centimeters	146.00	109.50	60
92	...	Shoes of leather or other materials, except silk, for children, less than 15 centimeters	5.47	....	25
93	...	Same, containing silk	13.14	....	25
94	...	As No. 92, for children	10.95	....	60
95	...	Same, with silk	21.90	....	60
96	104	Gaiters, of leather or leather and other material, except silk, for women and girls	26.28	21.90	60
97	105	Same, with silk	35.04	30.66	60
98	106	As No. 96, ordinary, for men and boys	52.56	35.04	60
	107	Same, high grade	....	....	60
	108	Gaiters and shoes of wool or mixed with cheaper material, with or without pieces of leather, for the sick and aged	....	19.17	60
	109	Leather sandals, for boys	....	8.76	60
99	110	Slippers of stamped cloth, plush, velvet, for men and women (no leather)	5.47	6.57	60
100	111	Same, with leather	9.12	8.76	60
			Kilo.	Kilo.	
101	112	Shoes and gaiters of any material, for games	2.92	2.92	60
102	113	Shoes or slippers of vegetable material, soles of hemp, jute, straw, etc.	.51	.73	60
103	114	Of rubber	1.46	1.46	25
104	115	Wooden shoes	3.28	3.28	60
105	116	Shoes with wooden soles	5.47	6.56	60
106	117	Leather clogs, with soles of leather	21.90	21.90	60

It will be noted that there are several classes in the old tariff of values that do not appear in the new tariff in the same form, but the duty on cattle from the Argentine Republic has been suspended for a period of two years by an act of the Chilean Congress which took effect December 16, 1907.

Export Tariff.

ART. 9.—All products of the soil and industry exported to foreign countries shall be exempt from duty.

ART. 10.—The foregoing exemption shall not apply to the under-mentioned articles, which shall be dutiable as follows:

1. Saltpeter, per metric quintal, 3 pesos 38 centavos, to be collected in the manner provided in article 11 of the present law.

2. Iodine, per kilo, 1 peso 27 centavos, levied in like manner as on saltpeter.

ART. 11.—Such part of the export duties as the President of the Republic may deem sufficient to meet the ordinary expenditure of the State in foreign countries shall be discharged by means of drafts on London at ninety days' sight, at the rate of exchange of 18 pence per peso (36½ cents).

The balance shall be paid in national money augmented by the exchange resulting from the commercial value of the peso compared to 18 pence.

A law promulgated on the 10th of August, 1908, imposes an export duty of 40 per cent on the value of silver bullion assaying 0.5 or less.

The valuation of the various articles of import, upon which the duty is levied, is published annually by the Chilean Government, in the "Tarifa de Avaluos," an English translation of which is published by the Department of Commerce and Labor of the United States.

Registration of Trade-Marks.

The Chilean law now in force bearing on registration of trade-marks contains the following regulations:

1. A register is open for the registration of trade and commercial marks, both national and foreign.

2. The name "trade-mark" is used to designate the marks placed by the manufacturers or producers on manufactured articles, either Chilean or foreign, while the name "commercial mark" designates the mark placed on the articles by the merchant who sells them.

3. Proper names, emblems, or any other signs adopted by a manufacturer or merchant to distinguish the article he makes or sells, will be considered as trade or commercial marks. In addition, they must carry the inscription "Marca de Fabrica," or the initials "M. de F.," or "Marca Commercial" (M. C.).

4. The name given a country estate, foundry, factory, or mill shall be the exclusive property of the owner of the said estate, foundry, factory, or mill.

5. The person registering a trade or commercial mark has the sole right to use the same.

6. Transfers of marks, or permission that may be given to others to use said marks, must be noted in the register and advertised for ten days in the newspapers.

7. Registration must be renewed after ten years, otherwise it becomes void.

8. The register referred to will be opened in the office of the National Agricultural Society, under the direction of the president of the society and a delegate named by the council, who must be a member of the board of directors of the society.

9. The entry in the register must state the day and hour in which the entry is made; the name of the proprietor, his name and domicile; the name of the place where the factory is established; the class of goods or commerce designated by the mark, and a facsimile of the mark. To this must be added the number of the order that corresponds to the mark deposited, and any other data that may be thought necessary. Both the register and the copy thereof given to the interested party must be signed by the president of the agricultural society or his deputy, by the interested party, and two witnesses.

10. A fee of 12 pesos will be paid to the society for the entry of a trademark, 3 pesos for a commercial mark, and 1 peso for an authenticated copy of the inscription.

11. Any person falsifying or making fraudulent use of a trade or commercial mark spoken of in the present law will be subject to the penalties prescribed by the penal code.

12. Articles bearing false marks will be confiscated for the benefit of the injured party, while the instruments of falsification will be destroyed.

13. A list of the marks registered will be published in August of each year.

Patents.

A patent can be secured in Chile by the inventor or author, or by his duly authorized agent. The agent must be duly authorized by a power of attorney, which, if drawn up in a foreign country, should be duly legalized by the Chilean Consul.

An application, giving a full description of the invention, with drawings, in duplicate, and samples or a model, if possible, should be filed with the Minister of the Interior at Santiago.

If the invention has been previously patented in another country the application must be advertised in the "Diario Oficial" for a period of thirty days.

If the patent is granted it is recorded in the Register of Patents, which is maintained by the Department of the Interior and the specifications and drawings are then sealed and deposited in the National Museum.

Patents are granted for a term of ten years, which term may, under certain conditions, be extended for another ten years.

The fee charged by the Government is 50 pesos ($18.25 United States currency), which is payable on the filing of the application.

Commercial Travelers.

The Government of Chile does not impose any license of any kind on commercial travelers, but the various Municipalities have the right to impose a license, which right is, however, rarely exercised.

Samples of merchandise may be admitted to the country without the necessity of immediate payment of duties, provided these samples do not consist of entire pieces of fabrics, or complete sets of articles

which would take from them the character of samples. If these samples remain in the country for more than six months, duty must be paid on them in accordance with the tariff, which provides that samples shall be admitted free of duty, provided the amount of duty on any one article does not exceed 2 pesos. In lieu of the payment of duties at the time of disembarkation a note is given by the owner, payable in six months, which note is returned if the samples are reshipped within that period.

Shipping of Merchandise.

Merchandise can be shipped from New York direct to Valparaiso or other ports in Chile by the Merchants Line and the West Coast Line or via Panama by the Panama Railroad & Steamship Co.; from San Francisco to Valparaiso or other Chilean ports by the Kosmos Line or the Pacific Mail Steamship Company. The Merchants Line and the West Coast Line have steamers leaving New York once a month, via Magellan straits, and the time occupied to Valparaiso varies from 40 to 50 days. The Panama Railroad Company have vessels sailing from New York every 5 days and the time employed via this route, with transhipment at Panama to the vessels of the coast lines, averages from 35 to 40 days. The Kosmos Line has regular fortnightly sailings from San Francisco, employing from 40 to 45 days from San Francisco, while the Pacific Mail S. S. Co. has regular weekly sailings from San Francisco to Panama, at which point goods are transhipped to one of the Coast Lines' steamers, the time thus employed averaging from 45 to 50 days.

All merchandise imported into Chile must be accompanied by a bill of lading and an invoice, both of which must be certified to at the port of shipment by the Chilean consul. Merchandise cannot be dispatched at the Custom House unless these documents are presented in due form and a heavy fine is imposed by the authorities if the documents are not presented or if the importer does not give a bond or surety, guaranteeing that they will be presented within a certain time.

The consular fee for the certification of a bill of lading, one or more copies, is $1.00 (U. S. currency) and for the certification of a set of invoices (4 copies), the value of the merchandise not exceeding $200, is $1.00 and $1.00 for every $1,000 above the said sum.

Both the bill of lading and the invoice must state the contents of each package and the weight in kilograms, and the correct weight, both gross and net, must also be clearly stencilled on each package. The Chilean Custom House allows only a 10 per cent leeway, and if the weight given on the packages does not correspond with the actual weight the importer may be prosecuted legally and his goods confiscated. Goods of different classes should also be packed separately as much as possible, or at least those paying the same rate of duty.

TABLE OF WEIGHTS AND MEASURES.

1 Milligram (1/1000 gram)	=	0.0154 grain
1 Centigram (1/100 gram)	=	0.1543 "
1 Decigram (1/10) gram)	=	1.5432 "
1 Gram	=	15.432 "
1 Decagram (10 grams)	=	0.3527 oz.
1 Hectogram (100 grams)	=	3.5274 "
1 Kilogram (1,000 grams)	=	2.2046 lbs.
1 Myriagram (10,000 grams)	=	22.046 "
1 Metric quintal (100,000 grams)	=	220.46 "
1 Spanish quintal (46 kilograms	=	1014.11 "
1 Ton	=	2204.6 "

Dry Measures.

1 Liter	=	0.908 quart
1 Decaliter (10 liters)	=	9.08 "
1 Hectaliter (100 liters)	=	2.838 bu.
1 Kiloliter (1,000 liters)	=	1.308 cu. yds.

Liquid Measures.

1 Liter	=	1.0567 quarts
1 Decaliter (10 liters)	=	2.6417 gallons
1 Hectaliter (100 liters)	=	26,417 "
1 Kiloliter (1,000 liters)	=	264.17 "

Measures of Length.

1 Millimeter (1/1000 meter)	=	0.0394 inch
1 Centimeter (1/100 meter)	=	0.3937 "
1 Meter	=	39.37 "
1 Kilometer (1,000 meters)	=	0.62137 miles

Surface Measures.

1 Are (100 square meters)	=	119.6 sq. yds.
1 Hectare (10,000 sq. meters)	=	2.471 acres.

CHAPTER IX.

FINANCE AND BANKING.

Revenues. Budget. Taxes. Public Debt. Banks. Currency. Exchange.

The public revenue is derived mainly from the export and import duties, especially from the export duty on nitrate, which is the chief source of income of the Chilean Government, the stamp tax, the tax on alcohol, from the State railways and from the Post Office and Government telegraph.

In Chile, as in most of the South American countries, the indirect rather than the direct system of taxation is in vogue, a tax being imposed on all commercial documents and others, such as insurance policies, contracts of any kind, ships manifests, bills of lading, invoices, receipts, drafts, notes, and in fact any document which contains a promise to pay or acknowledges the receipt of money or of something the value of which can be estimated in money, or which involves a certain amount of money, shall be subject to this stamp act, in accordance with the following schedule:

From ten pesos to one hundred pesos, inclusive, one centavo.

From one hundred to two hundred pesos, inclusive, two centavos and one centavo for each one hundred pesos over and above that amount, provided the document does not extend beyond one year. If the time exceeds one year, the same tax is charged for every year, or fraction thereof. The total amount of the tax, computed by the above scale, must be attached to the document at the time of its issuance, and no document is legal or valid unless the said tax has been affixed. The tax is applied by means of stamps, issued for the purpose by the Government, or by using the stamped paper (papel sellado) of the corresponding value.

The following documents are exceptions from the above rule, the stamp tax being fixed as follows:

Bills of Exchange, whether issued in the country or drawn on someone residing in the country, shall be subject to a tax of ten centavos if the amount is for one thousand pesos or less and twenty centavos for anything above that amount.

Receipts of any kind, not including those issued by banks, five centavos.

Register of ships, one peso.

Diplomas of Doctors, Dentists, Lawyers, Civil Engineers or of any profession which requires the authority of the Government, shall be subject to a tax of ten pesos.

The following table shows the revenues and expenditures, in pesos gold, for the last six years:

Year.	Revenues.	Expenditures.
1902	$105,515,849.20	$134,639,564.38
1903	114,208,928.52	116,995,225.12
1904	115,654,448.01	103,562,253.12
1905	159,195,266.83	130,326,748.66
1906	111,089,725.00	169,951,601.00
1907	117,489,883.00	121,454,616.00

The budget for 1908 submitted by the Executive to the Chilean Congress on June 17, 1907, estimated the total amount of revenues at 188,000,000 pesos paper money (one peso paper equal to 0.18 United States currency) and the total amount of expenditures at 223,464,416 pesos paper. Adding to the revenues the amount of 32,000,000 pesos to be derived from loans that have been negotiated, the total amount of the revenues would be 220,000,000 pesos.

The expenditures are distributed as follows:

	Pesos.
Interior	38,564,890.00
Foreign Relations, Worship, and Colonization	3.341,506.19
Justice	6,866,775.00
Public Instruction	17,356,521.21
Finance	43,748,690.82
War	18,240,072.97
Navy	17,566,709.90
Industry	77,779,250.41
Total	223,464,416.50

PUBLIC WORKS.

Of this total 58,492,000 pesos are for the construction of important public works, distributed as follows:

	Pesos.
Construction and improvement of railroads	16,500,000
Arica-Alto de La Paz Railroad	16,000,000
Reconstruction of Valparaiso	8,000,000
Sewer system of the city of Santiago	5,000,000
Hydraulic works in the ports of Talcahuano, Valparaiso, Constitución, Valdivia, and other ports and cities	3,524,000
Water systems and sanitation of cities	3,000,000
School buildings	1,276,000
Palace of the Government and other Government buildings	1,015,000
Construction of bridges	1,000,000
Palace of Justice, penitentiaries, and jails	907,000
Churches and barracks	835,000
Agricultural, mineral, and professional schools	450,000
Other public works	985,000
Total	58,492,000

Revenues.

The amounts estimated for the regular sources of revenue are given in the budget as follows:

	Pesos.
Export duties on nitrate	65,300,000
Export duties on iodine	700,000
Import duties	48,000,000
Frontier custom houses	1,000,000
Duties on parcels post	2,000,000
Lighthouses and beacons	650,000
Posts and telegraphs	3,000,000
Interests on bonds	1,550,000
Stamped paper and stamps	1,000,000
Tax on alcohol	2,000,000
Debtors' lands purchases	1,000,000
Sale of Government property	500,000
Other revenues from sub-treasuries	2,500,000
Railroads	36,000,000
Gold premium on 76,000,000 pesos (13¼)	22,800,000
Total	188,000,000

PUBLIC DEBT. The public debt of Chile amounted to 482,955,126 pesos gold ($132,316,473 United States currency) on January 1, 1908, of which 87,741,087 pesos ($24,038,654 United States currency) was internal and the balance external debt. Nearly all the foreign loans date from the year 1885, all previous loans having been cancelled, the majority of them having been floated in London and bearing 4½ and 5% interest, there being only one bearing 6%.

The internal debt covers the paper currency issued by the Chilean Government, which is gradually being redeemed and for which purpose the Chilean Government maintains a conversion fund, which now amounts to about $25,000,000 United States currency. This fund is deposited in various European and American banks, drawing interest, and will be available for the purpose specified after January 1, 1910.

The Chilean Congress passed a law in the year 1907, which provides as follows:

(1) Customs duties shall not be paid in gold, as has been the practice, but in paper money of legal currency.

(2) The total amount of paper issued shall remain fixed at 150,000,000 pesos, at a normal value of 18 pence (English) per peso. The paper issue shall hereafter not be increased over and above that amount, except against gold deposited by private individuals in the Treasury, who can, at any time, demand gold in exchange for their bills.

(3) The Government is authorized to contract a loan of 3,000,000 pounds sterling, to be used for the reconstruction of Valparaiso and other public works.

(4) The Government will establish a Mortgage Bank to facilitate the opening of new nitrate fields. Short-dated debentures will be issued for this purpose, guaranteed by the nitrate tax levied by the Government. The said financial institution shall have a working capital of 5,000,000 pesos.

(5) The Government is also authorized to contract a loan for the balance of the amount required to redeem the entire amount of paper money outstanding.

BANKS. There are 22 Banks in Chile with authority to issue notes, besides three foreign banks having agencies in different parts of the country and 12 Savings Banks. The National Banks, or those authorized to issue notes, are required to guarantee their notes by depositing gold, Government bonds, or other securities established by the Government, at the Treasury.

The balance sheets of the various Banks of Chile, published on December 31, 1907, show the following figures:

LIABILITIES:	Pesos.
Paid up capital	124,040,525.63
Reserve and guarantee funds	25,765,952.50
Funds, for dividends, withdrawal, etc	3,491,322.19
Fund for incidentals	1,236,468.85
Dividends unpaid	278,362.76
Deposits	415,205,924.06
Bonds, etc., deposited	194,795,990.55
Pending transactions	5,191,211.94
Other accounts	34,826,836.06
Profit and loss	6,530,668.63
Total	811,363,263.17
ASSETS:	
Cash on hand	88,745,808.07
Bonds and securities	14,823,250.82
Real estate and other property	10,773,369.84
Agencies	17,661,641.06
Bonds, etc., in custody and security	194,795,990.55
Advances	478,548,846.71
Other accounts	6,014,356.12
Total	811,363,263.17

The following Banks were established in Chile on December 31, 1907:

Bank of Chile, Bank of Santiago, Bank A. Edwards & Co., Bank of the Republic, Spanish Bank of Chile, German Transatlantic Bank, Bank of Chile and Germany, Bank of Talca, Bank of Concepción, Bank of Curico, Bank of Melipilla, Bank of Ñuble, Credit Bank, Popular Bank, Bank of Arauco, Bank of Tacna, Italian Bank, Bank of the Commercial Union, National Bank, Mercantile Bank of Tacna, Bank of Constitución, Anglo-South American Bank, Commercial Bank of Curico, Bank of London and the River Plate, Mortgage Bank of Chile, Chilean Bank of Values, Mortgage Bank, Valparaiso, Bank of Punta Arenas, Bank of Mines, Mercantil Bank, Tacna, Industrial Bank of Chile and France.

The largest of these Banks is the Bank of Chile, having a paid up capital of 30,000,000 pesos and a cash reserve of 39,664,405.64 pesos. The Bank of Chile has branches in all the important towns of Chile, as also an agency in London and one in Oruro, Bolivia. The Spanish Bank of Chile, the National Bank and the Italian Bank also have several branches in the Provinces. The Anglo-South American Bank has branches in all the principal towns of Chile, as also a number of

branches in the Argentine Republic, Uruguay, New York and Hamburg, their principal offices being at London, England. The London and River Plate Bank, Ltd., which has its head office in London, and has branches in all the more important towns of South America, is also established at Valparaiso.

CURRENCY AND EXCHANGE. The monetary system of Chile is the gold peso of 100 cents, the value of which has been fixed some time ago by the Chilean Government at 18 pence (equal to $0.365 in United States currency), but the currency is mostly paper, issued by the Government in lieu of the gold. The value of this paper money fluctuates considerably, but the Chilean Government has taken steps to redeem all the paper money outstanding, by setting aside yearly certain sums derived from special revenues, and it is expected that all of the paper money will be withdrawn in the year 1910 and be replaced by gold certificates or legal tenders.

The money of Chile consists of gold coins of 20, 10 and 5 peso pieces, called, respectively, condor, doblon and escudo; silver coins of one peso, twenty, ten and five centavos, and copper coins of 2½, 2, 1 and ½ centavo.

The Government notes are issued in denominations of 1,000, 500, 100, 50, 20, 10, 5, 2, and 1 peso and Bank notes in 1,000, 500, 100, 50 and 20 pesos.

Business is transacted largely by means of letters of credit or drafts, the prospective buyer or purchaser establishing a credit with some Bank in New York or in Chile, as the case may be, and drawing against his credit. This method is preferred, as it allows the buyer to sell his letter of credit or draft whenever the rate of exchange may be most favorable. The Chilean Government will also accept drafts in payment of import or export duties, provided they are sufficiently guaranteed.

CHAPTER X.

MEANS OF COMMUNICATION.

Railways. Steamship Lines. Telegraphs and Telephones. Postal Service.

Chile enjoys the distinction of having had the first railway in South America, which was the railway built from the port of Caldera to the silver mines of Copiapó. This road was built by an American, William Wheelwright, and was opened for traffic on the 4th of July, 1851. William Wheelwright is closely identified with the development of railways in Chile and is likewise responsible for the establishment of the first line of steamships on the Pacific Coast. Another American, Henry Meiggs, of New York, was also instrumental in bringing about better means of communication and transportation in Chile. Four years after the Copiapó railway was completed he began work on the Central Railway from Santiago southward to San Fernando, a distance of 80 miles. The line from Valparaiso to Santiago was likewise constructed by Henry Meiggs, for the Chilean Government, and this road, which had been commenced by Wheelwright several years before, was finally opened for traffic in the year 1863.

There are now some 3,000 miles of railway in Chile, one-half of which, 1,537 miles, is operated and owned by the Government, and the other half, 1,491 miles, by private companies. Of the State railways there are 1,200 miles with a gauge of 5 feet 6 inches, 300 miles with a gauge of 3 feet 3.36 inches and 37 miles with a 3 feet 6 inch gauge. The private railways have seven different gauges, as follows:

1.68	meters	equal	to	5	feet	6	inches.
1.44	"	"	"	4	"	8½	"
1.37	"	"	"	4	"	8	"
1.27	"	"	"	4	"	2	"
1.07	"	"	"	3	"	6	"
1.00	"	"	"	3	"	3⅜	"
0.76	"	"	"	2	"	6	"

All the more important mining centers in the northern Provinces are connected with the nearest ports by rail, and the State Central Railway extends from Valparaiso to Santiago, forming a junction at Llai-Llai with a short branch that extends to the city of Los Andes and connects there with the Transandine Railway which, when completed, will unite the Chilean with the Argentine Railway systems. From Santiago the State Central Railway extends southward as far as Valdivia and thence to Osorno, the main line dividing at San Rosendo

junction, in the province of Concepción, one branch going northwest to Concepción and the port of Talcahuano, and the other branch continuing southward to Temuco and Valdivia. A railway from Osorno to Puerto Montt is now in course of construction.

The following statement issued December 31, 1907, shows the government railways about to be constructed in Chile, their gauge, mileage, metal bridges, tunnels, and estimated cost:

Railways.	Gauge. Feet.	Length of lines. Miles.	Bridges, metal. No.	Tunnels. No.	Estimated cost.
Pueblo Hundido to Curillas	3.3⅜	258.8	..	..	$3,809,910
Papudo to Quimquimo	3.3⅜	11.5	3	..	427,078
Cabildo	3.3⅜	61.9	16	3	
Illapel to San Marcos	3.3⅜	58.5	29	2	21,900,000
Serena to Vallenar, and Vallenar to Toledo and Copiapo	3.3⅜	245.6	21	4	
Rancagua to Donihue	3,3⅜	13.1	4	1	277,611
San Vicente to Peralillo	5.6	24.6	10	..	1,158,793
Alcomes to Pichilemu	5.6	17.5	1	5	2,343,627
Curico to Hualañe	5.6	40.5	5	1	1,457,500
Hualañe to Lico	5.6	31.8	5	..	3,914,910
San Vicente to Colorado and Queri	3.3⅜	17.0	1	..	333,462
Linares to Calbun	....	20.8	8	..	268,616
Castro	....	50.7	..	1	1,332,250
Total	....	852.3	103	17	37,223,757

LENGTH OF BRIDGES AND TUNNELS.

The length of the metal bridges on the several lines are given as follows, in feet: Papudo to Quimquimo (3), 49.5, 49.5, and 99; Cabildo (16), two of 33, four of 99, two of 132, and one each of 149, 198, 297, 330, 594, 792, and 1,122; Illapel to San Marcos (29), two of 50, four of 66, five of 83, three of 99, three of 132, two of 231, and one each of 33, 106, 158, 198, 263, 264, 363, 396, 412, 495, and 1,155; Serena to Vallenar, etc. (21), seven of 33, four of 50, two of 66, two of 198, one each of 237, 264, 297, and 330, and two of 660; Rancagua to Donihue (4), 17, 33, 40, and 99; San Vicente to Pichilemu (10), three of 33, one each of 50, 53, 73, 112, 142, 432, and 505; Alcon to Pichilemu (1), 99; Curico to Hualañe (5), 99. 205, 205, 119, and 2,178; Hualañe to Llico (5), 25, 40, 66, 205, and 716; San Vicente to Colorado, etc. (1), 33, and smaller ones; Linares to Colbun (8), 33 and three smaller ones, 66, 66, 99, and 330.

RAILWAYS UNDER CONSTRUCTION.

The following statement shows the railways now being constructed:

From and to—	Miles.
Melipilla to San Antonio	32
Alcones to Tunel del Arbol	8
Rucapequen to Confluencia	11
Pua to Selva Oscura	12
Nueva Imperial to Carahue	14
Osorno to Puerto Montt	78
All other	6
Total (gauge 5 feet 6 inches)	161
Arica to La Paz	259
Animas to Los Pozos	12
Inca to Chulo	55
Ovalle to Trapiche	9
Palermo to San Marcos	25
Chopa to Illapel	12
Choapa to Salamanca	17
Rayado to Trapiche	16
Total (gauge 3 feet 3.36 inches)	405
Puerto Alto to Volcan (gauge 2 feet 3.6 inches)	46
Total being constructed	612

According to a statement just made public by the Chilean Government the termini and mileage of State railways of this country are clearly set forth in the following tables:

RAILWAYS IN OPERATION.

From and to—	Miles.
Coquimbo to Puntilla	57
Valparaiso to Osorno	788
Las Vegas to Los Andes	30
Santiago to Melipilla	38
Pelequen to Las Cabras	17
Centinela to Alcones	51
Parral to Cauquenes	30
San Rosendo to Talcahuano	53
Santa Fe to Los Angeles	13
Coigue to Mulchen	26
Renaico to Traiguen	58
Tomuco to New Imperial	24
Antilhue to Valdivia	18
Miscellaneous small lines	14
Total (gauge 5 feet 6 inches)	1,217

From and to—	Miles.
Chañaral to Pueblo Hundido	7
Empalme to Inca de Ocoa	33
De Carpa y to Las Animas	13
Huasco to Vallenar	30
Coquimbo to Rivadavia	58
Ovalle to Las Palmas	42
Vilos to Choapa	36
Cabildo to Calora	45
Talca to San Clemente	12
Talca to Constitución	56
Total (gauge 3 feet 3.36 inches)	332
Tongoy to Trapicho (gauge 3 feet 6 inches)	40
Total (gauge 3 feet 6 inches)	40

PROJECTED RAILWAYS.

The following statement shows the railways projected and the condition of advancement:

From and to—	Miles.
Plans already made:	
Vallenar to Viscachitas	29
Rayado to Papudo	15
Quilpue to Melipilla	59
Curico to Hualañe	23
Rancagua to Donihue	13
Sauces to San Antonio	22
Linares to Colbun	20
Selva Oscura to Curacautin	17
San Clemente to Colorado	12
Total	210
Plans in course of preparation:	
Pueblo Hundido to Pampa Central	286
Serena to Rivadavia	18
San Vicente to Peralillo	24
Tunel del Arbol to Pichilemu	17
Confluencia to Tome	46
Total	391
Projected:	
Pampa Alto to Toco	70
Pueblo Hundido to Juncal	57
Copiapo to Vallenar	107
Cabildo to Choapa	78
Trapiche to Vilos	59

From and to—	Miles.
Projected—Continued:	
Rivadavia to Monte Grande	11
Tolon to Viscachitas	132
Cauquenes to Mar	60
Illapel to San Marcos	79
Talagante to Paine	15
Curico to Queñes	27
Santiago to Casablanca	46
Batuco to Yungai	22
Yumbel to Rio Claro	8
Chillan to Las Termas	63
Angeles to Antuco	54
Victoria to Traiguen	6
Loncoche to Villarica	27
Union to Rio Bueno	7
Total	928
Under consideration:	
Sauce to Lebu	29
Artificio to Chincolco	21
Tome to Penco	11
Vina del Mar to Cocon	12
Total	73
Total projected	1,602

PRIVATE RAILWAYS. The Antofagasta and Bolivian Railway, with a gauge of 2 feet 6 inches, is the largest of the private railways of Chile. It extends from the port of Antofagasta to Oruro in Bolivia, a distance of 600 miles, the last station on the Chilean side being Ollague. A branch line connects with the new port of Mejillones.

The Nitrate Railway, 4 feet 8½ inches gauge, runs from Iquique to Pisagua in the North and to Lagunas to the South and thence to the port of Patillos. Its chief cargo consists of nitrate of soda, and it is remarkable for its heavy gradients from the ports up to the plateaux. It has a total length of 320 miles.

The Tocopilla Railway, 3 feet 6 inches gauge, is owned and operated by the Anglo-Chilean Company. It connects the mines of the said company at Toco with the port of Tocopilla, a distance of 55 miles.

The Taltal Railway, 3 feet 6 inches gauge, runs from the Port of Taltal to Cachinal de la Sierra and the mines of Arturo Prat, a distance of 85 miles. A branch line connects some of the important mining centers, especially Santa Luisa, with the main line, extending from

ROAD TO JUNCAL, CHILE.

The fine, broad mountain road to Juncal, Chile, on the line of the Transandine Railway, near the Uspallata Pass, follows the course of the turbulent Aconcagua River to Los Andes, and before the construction of the railroad was the great overland highway from Chile to the Argentine Republic. This road leads to the Salto del Soldado (Soldier's Leap), where it is said a Chilean cavalryman of the war of independence leaped his horse over a yawning chasm in order to escape capture by the enemy.

Canchas north and westward and connecting again with the main line at Refresco. This loop has a total length of 52 miles.

Arica and Tacna Railway, 4 feet 8½ inches gauge. From the Port of Arica to Tacna, a distance of 30 miles. This railway was to

be continued to La Paz, Bolivia, but the project has been abandoned and a more direct route from Arica to Ancara has been adopted by the Chilean Government.

Agua Santa Railway, 2 feet 6 inches gauge, extends from the Port of Caleta Buena to the Agua Santa mines and connects with the railway from Iquique to Pisagua. It is owned and operated by the Agua Santa Nitrate Company and measures 24 miles. The descent from the plateau to the sea level, some 2,000 feet, is made by means of a wire rope.

The Junin Railway, 2 feet 6 inches gauge, is likewise owned by the Nitrate Company, and extends from the Port of Junin to Sacramento, where it also connects with the railway from Pisagua to Iquique. It

STONE REFUGE HOUSE IN THE ANDES.

Houses of this character have been built at short intervals along the dangerous parts of the highways over the Uspallata and other frequented passes of the Chile-Argentine Andean Range, the first one having been erected in 1791 by Governor Ambrosio O'Higgins. Violent storms sometimes overtake travelers crossing the mountains, and refuge is afforded in these houses until the fury of the tempest abates.

is 21 miles long, and as at Caleta Buena the freight is lowered to the port by means of wire ropes, some 2,100 feet in height.

The Transandine Railway, which is to connect Santiago with Buenos Aires in the Argentine Republic, or in other words, connect the Pacific with the Atlantic Ocean, is open for traffic as far as El Portillo

on the Chilean side, at the foot of the main range of the Andes. The Chilean section of this railway will meet the Argentine section in a tunnel under the Cumbre of the Andes at a height of 10,500 feet above the level of the sea. The maximum gradient of this road is not to exceed 8 per cent and its gauge will be 3 feet 3⅜ inches. The Transandine connects with the Chilean State Railway at Los Andes, the distance from Los Andes to Juncal being 28½ miles. The total length of this tunnel is to be 9,940 feet, of which 1,400 feet have thus far been completed and it is expected that the road will be open for traffic in the year 1911.

The Arauco Railway, 5 feet 6 inches gauge, owned and operated by the Colliery Company, runs from the Port of Coronel to Concepción in the north and to Lota in the south, and is chiefly used for hauling coal from the mines.

The Caldera and Copiapó Railway, 4 feet 8½ inches gauge, from the Port of Caldera to Copiapó, 50 miles distant. This was the first railway built by William Wheelwright and the first railway in South America. It is important because of the rich copper mines near Copiapó.

The Antuco Transandine Railway, 3 feet 28 inches gauge, starts from Monte Aguila, on the 5 feet 6 inches gauge longitudinal railway in the same latitude as Concepción and is to cross the frontier near the Lake of Antuco. The section from Monte Aguila to Huepil, 31 miles in length, has been opened to traffic.

The Branden Copper Company is constructing a railway from Rancagua to Mineral del Teniente, a distance of 43 miles, which is to be used chiefly for the transportation of minerals.

The Industrial and Agricultural Society, "Nueva Italia," is constructing a railway from Sauces to Capitan Pastene and another company is constructing a railway from Collilefu to Lake Pirihuaico, a distance of 25 miles.

STEAMSHIP LINES. The Ports of Chile are visited by seven European lines, as follows: The Pacific Steam Navigation Company, with a fleet of 43 steamers, touching at Arica, Pisagua, Iquique, Tocopilla, Antofagasta, Caldera, Carrizal Bajo, Huasco, Coquimbo, Valparaiso, Talcahuano, Tomé, Coronel, Lota and Puenta Arenas; the Lamport and Holt Line, with 8 steamers; Andrew Weir & Co.'s line of 20 steamers and 19 sailing vessels; Lowthor, Latta & Co.'s line, with 12 steamers, these 3 lines having mostly freight boats with irregular sailings. The Kosmos Line, with a fleet of 47 steamers, touches at the following Chilean ports: Arica, Tocopilla, Antofagasta, Caldera, Carrizal, Huasco, Coquimbo, Valparaiso, Talcahuano, Coronel, Ancud, Wellington and Punta Arenas and sails up the West Coast as far as San Francisco; and the Roland Line has 10 steamers, and is also a freight line.

Three lines of steamers ply between the Atlantic ports of the United States and Chile, viz: the New York and Pacific S. S. Co.,

sailing irregularly every 3 weeks and the West Coast Line, sailing once a month from New York, and stopping at all ports in Chile, while the former line stops at the principal ports only. The Barber Line has also initiated a regular service between New York and the West Coast. All three of these are principally freight lines.

The Chilean merchant marine is the second largest in South America, being exceeded only by Brazil, having a total tonnage of 153,316 tons. The Compañia Sud-Americana de Vapores, with a fleet of 20 steamers, flying the Chilean flag, maintains a regular weekly service along the Chilean coast, Perú and Ecuador.

The Government has recently subsidized a line of steamers from Valparaiso to Panama, under condition that they make the run in 8 days and have regular weekly sailings. This Company is to receive an annual subsidy of 100,000 pesos. The steamers will leave Valparaiso and Panama regularly every 12 days.

The Compañia Trasportes Unidos maintains a regular weekly service with the Argentine Republic via the Andes Mountains, by rail as far as Juncal, then by mule over the mountains and then again by rail on the Argentine side, making the entire trip from Valparaiso to Buenos Aires in 56 hours. This service is, however, only open during the spring and summer, that is to say, from September to April, it being practically impossible to cross the mountains in winter. The cost of this trip is $60.00 first and $40.00 second class.

POST AND TELEGRAPH. The postal and telegraph service in Chile is efficient, although it is at times difficult to maintain a regular service in the interior, owing to lack of communications. There are, however, 863 post offices in the Republic and the Government is endeavoring to increase the efficiency of the service as much as possible. In 1907 the mails carried 78,016,169 postal pieces, both first and second class matter, and the movement of postal money orders amounted to 27,500,000 pesos gold (1.00 peso gold equal to $0.365 United States currency).

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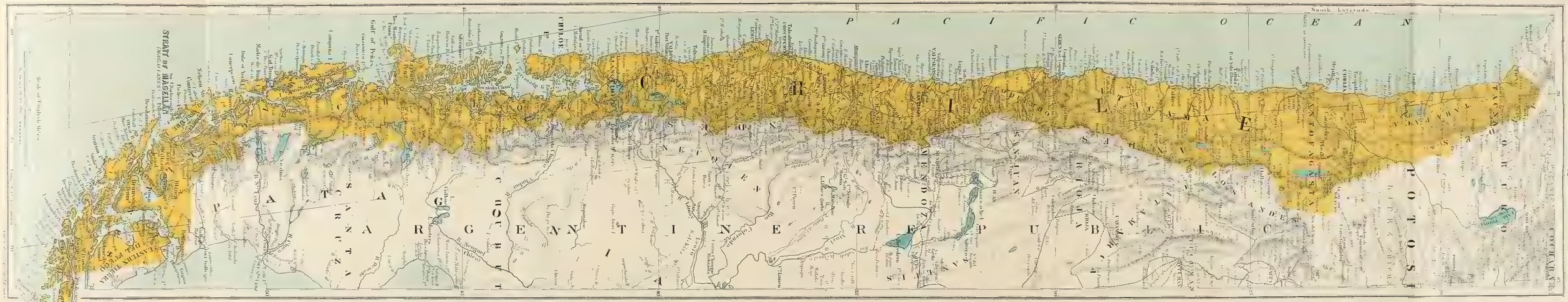
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